Clarion

SERVICE MANUAL

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MODEL MD-7800G

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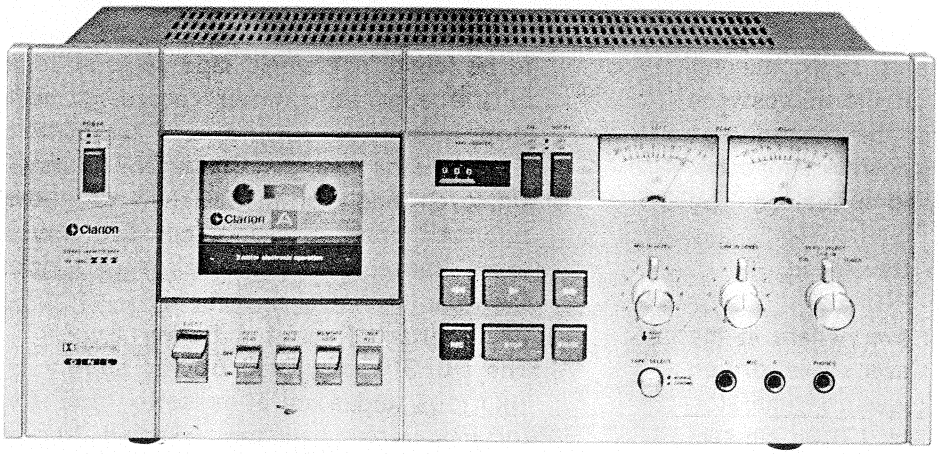
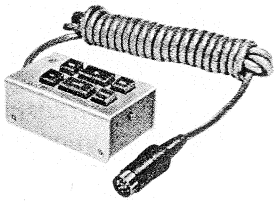




■SPECIFICATIONS

System: 4 track 2 channel stereo
Tape Speed: 4.8cm/sec
Wow and Flutter: 0.07%(WRMS)
Frequency Response: 20Hz~18,000Hz (chrome tape)
20Hz~15,000Hz (low noise tape)
Distortion: Less than 1.5% (1KHz 0dB)

S/N Ratio:

DOLBY NR	OFF	DNL	OFF	55dB
DOLBY NR	ON	DNL	OFF	63dB
DOLBY NR	OFF	DNL	ON	60dB
DOLBY NR	ON	DNL	ON	68dB

Recording Bias: AC bias 105KHz
Erase: AC erase system
Erase Efficiency: 70dB
Inputs: MIC
Max. input sensitivity 0.3mV
(Recommended impedance: 600ohms ~10K ohms)
LINE IN
Max. input sensitivity: 30mV
TUNER IN
Max. input sensitivity: 30mV
(Input impedance: 90K ohms)
Outputs: LINE OUT
Reference output level: 0.5V
(Load impedance: more than 50 kohms)
PHONES
8 ohms
DIN Jack: REC/PB EIAJ specification
Semiconductor Complement:
1 Hall IC, 2 DNL IC, 2 FET, 47 transistors, 3 SCR, 52 diodes
Rectifiers: 5

Printed in Japan 298-1884-00

Motors:	2
Solenoids:	3
Power Supply:	AC 240V 50Hz AC 220V 50Hz AC 117V 60Hz
Power Consumption:	23W
Dimensions:	207(H)×467(W)×227(D)mm
Weight:	10Kg

- These specifications and design may be altered without notice due to product improvements.
- Dolby system licensed by Dolby Laboratories Incorporated.
- Tape recording for personal enjoyment is generally unrestricted. Commercial uses, such as selling recordings of material under copyright, are subject to copyright and other laws.

■FEATURES

■Professional Type Design

Operational ease is built-in by the simplified and straight-forward panel layout. All operations are performed from the front panel. The shallow depth design efficiently utilizes available installation space, while the professional component styling adds an elegant accent to the listening room.

■Gentle Touch Operating Buttons

Tape transport functions are performed electronically by relay and semiconductor circuits. Just a light touch of the microswitch activating buttons selects the desired tape running mode. Operation is gentle and quick, while a delightful professional feel can be fully enjoyed.

■High Performance Clarion Developed Transport

New technology is evident everywhere in the vertical design transport. Capstan is driven by a superbly stable FG (frequency generator) type servo motor and large 1700g-cm-sec^2 inertial mass flywheel. The capstan itself is high precision machined, leading to a remarkable 0.07% (WRMS) wow and flutter. Two motors and three solenoids provide smooth and precise tape motion, tape running is directly observable, and cassette insertion and removal are performed by one-touch actions. Since the mechanism can operate from either 50Hz or 60Hz AC power, it can be used freely in countries where the AC power frequency varies according to locality.

■Dolby System Built-in

Widely acclaimed Dolby system is built-in and can be used during recording and play-back for refreshing reduced noise tape recordings. ("Dolby" is a trademark of Dolby Laboratories Inc.)

■DNL(Dynamic Noise Limiter) Built-in

This circuit operates during playback only to provide additional noise reduction. A new IC, developed by Clarion, improves performance and reliadility. The circuit is also very effective for non-Dolby recorded tapes.

■Hall IC Full Auto Stop System

The full auto stop mechanism incorporates a headline making Hall element in a hybrid IC plus a ring magnet. As the system functions without electrical contacts, automatic stopping of the tape at the end of a side is accomplished without operating noise or stress to tape and mechanism.

■Full Complement of Automatic Mechanisms

Seldom is such extensive automatic versatility to be found in a single tape deck. In addition to the auto stop, timer recording, memory stop, automatic rewind, and automatic play mechanisms are provided. These may be employed singly or combination to allow automatic operations and repetitive playback to be enjoyed. A remote jack is also included for remote control operation.

■High Voltage Regulated Power Supply

The DC 30V regulated power supply is a luxurious extra in a cassette tape deck. Dynamic range becomes widened, frequency response imporved and distortion reduced. Record/playback response is additionally stabilized against fluctuations in AC primary voltage, temperature and other ambient conditions. The excellent SN ratio also contributes to rich and clear sound quality.

■Electronic Muting

Record/playback switching noise is completely eliminated by the electronic muting switch. High quality recordings can be enjoyed.

■Mic Mixing Input

Microphone mixing can be performed in any position of the input selector switch. Independent recording level controls are also provided.

■Large Size Level Meters Plus Peak Indicator

Recording and playback levels are displayed on large, high performance level meters, while the peak indicator can detect even instantaneous input levels of more than +3dB. These contribute to excellent, low distortion recordings.

■ADJUSTMENT —Electrical Section—

Adj. order	Adjustment Item	Test Tape and Instruments
1	Speed	Test tape 3HKz-10VU(25mM) (TEAC MTT-111 or equivalent) Frequency counter
2	Azimuth	Test tape 8KHz-10VU(25mM) (TEAC MTT-113C or equivalent) Millivoltmeter, oscilloscope
3	Reproduction frequency characteristic (normal)	Test tape 8KHz-10VU(25mM) (TEAC MTT-113C or equivalent) 333Hz-10VU(25mM) Millivoltmeter, oscilloscope
4	Reproduction frequency characteristic (chrome)	Test tape 8KHz-10VU(25mM) (TEAC MTT-113C or equivalent) 333Hz-10VU(25mM) Millivoltmeter, oscilloscope
5	Reproduction voltage gain	Test tape 400Hz 0VU(200mWb/m) (TEAC MTT-150 or equivalent) Millivoltmeter, oscilloscope
6	Meter sensitivity	Test tape 400Hz 0VU(200mWb/m) (TEAC MTT-150 or equivalent) Audio oscillator, millivoltmeter, oscilloscope
7	Peak indicator sensitivity	Audio oscillator, millivoltmeter, oscilloscope
8	Bias trap (recording amp.) bias current	Millivoltmeter, oscilloseope
9	Recording sensitivity (normal)	Test tape BASF TP-18 Audio oscillator, millivoltmeter, oscilloscope
10	Recording sensitivity (chrome)	Test tape T.D.K. KR-C-60 Audio oscillator, millivoltmeter, oscilloscope
11	Recording frequency characteristic (normal)	Test tape BASF TP-18 Audio oscillator, millivoltmeter, oscilloscope
12	Bias trap (Dolby-NR)	Millivoltmeter, oscilloscope
13	19KHz MPX Filter	Audio oscillator, millivoltmeter, oscilloscope
14	GV of Dolby-NR Law of Dolby-NR	Audio oscillator, millivoltmeter, oscilloscope
15	D.N.L	Test tape BASF TP-18 (unrecorded tape) millivoltmeter, oscilloscope, amp., speaker

NOTES

1) The above adjustment must be performed by switching the primary side voltage selector to the usage voltage AC240V, 220V, 117V. Moreover, the adjustment must be performed at normal temperature.

2) When using test tape, the head must be thoroughly demagnetised

3) The millivoltmeter must be a highly sensitive millivoltmeter having 1mV or 1.5mV range.

4) If the above adjustment order is not followed, characteristics may not be sufficiently clear.

1. Adjusting Head Azimuth

If orientation of the head is not proper with respect to tape, quality of sound will be poor and crosstalk, etc. will be produced. When head azimuth is not correct, adjust as follows.

Play the test tape 8KHz - 10VU and adjust the head azimuth adjusting screw so that the output becomes maximum.

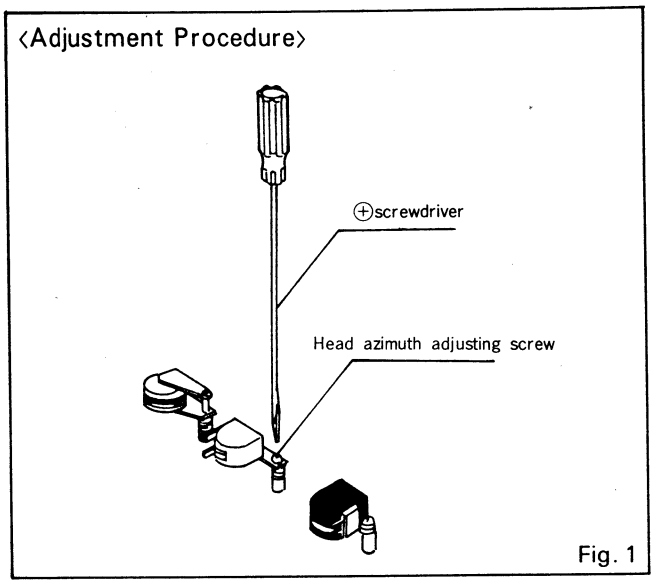


Fig. 1

(Adjustment conditions)

1. Mechanism operating button	PLAY
2. DOLBY NR	OFF
3. DNL	OFF
4. TAPE	Normal
5. LINE OUT volume	MAX
6. Reproduction gain control(30KΩ)	Center
7. Normal tape f characteristic use control(10KΩ)	Center

(CAUTIONS)

1. The screwdriver used for adjustment must be completely demagnetised.
2. Azimuth adjustment must be performed by setting the normal tape f characteristic VR(10KΩ)
   reproduction GV use VR(30KΩ)
   at the center position.
   GV: gain control Volume.
3. If escutcheon is mounted, adjustment must be performed after removing the cover of pack.

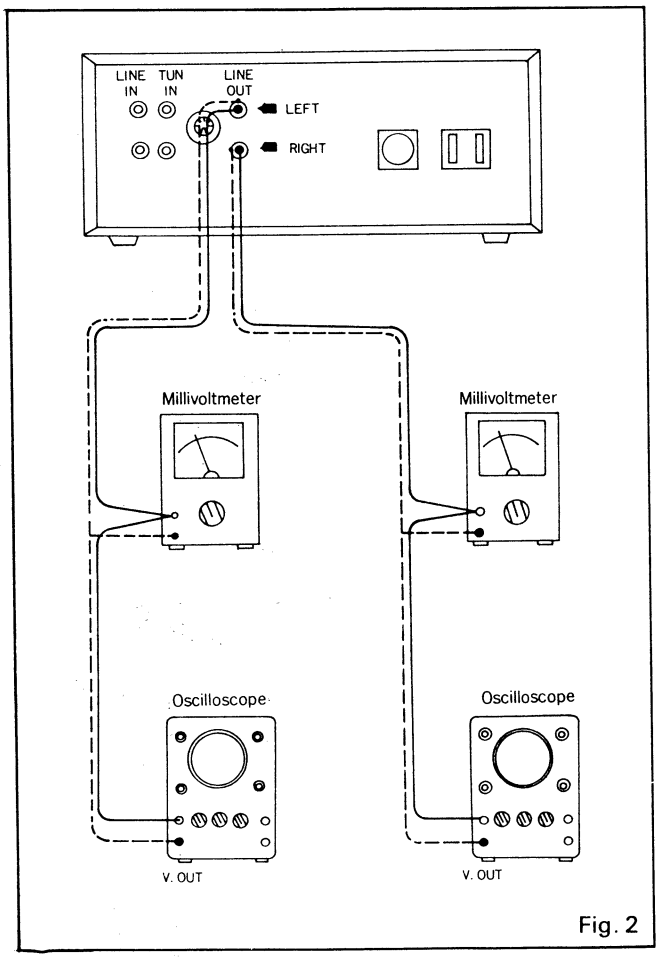


Fig. 2

2. Adjusting Motor Speed

Set the LINE OUT control at MAX, play the test tape 3KHz - 10VU(25mM, TEAC MTT 111 or equivalent), and adjust so that the motor speed becomes 3000 ± 10Hz.

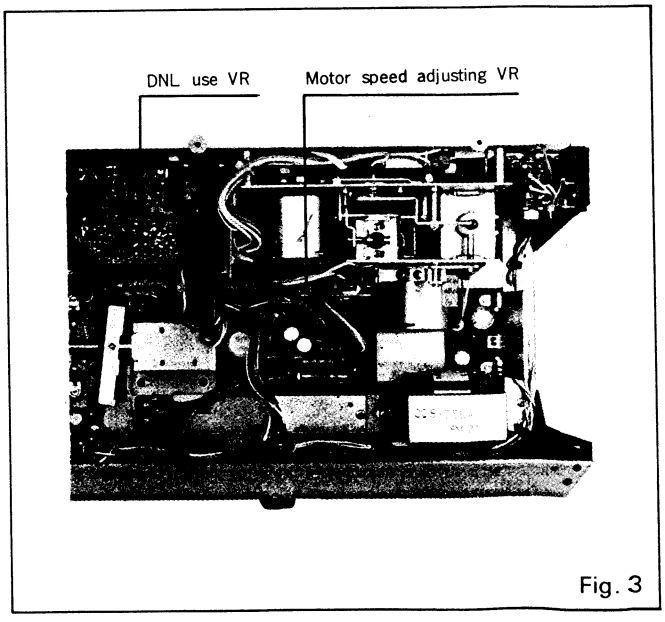


Fig. 3

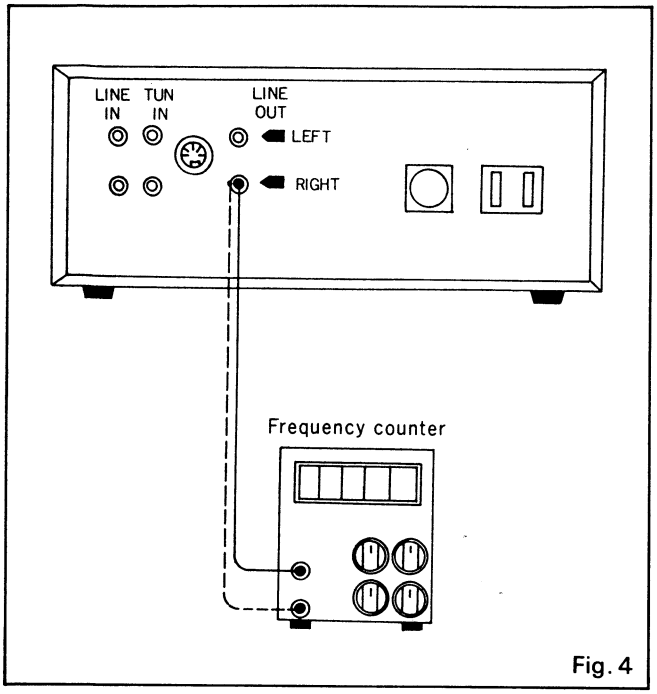


Fig. 4

〈Adjustment Conditions〉

1. Mechanism operating button	PLAY
2. DOLBY NR	OFF
3. DNL	OFF
4. TAPE	Normal
5. LINE OUT	MAX
6. Reproduction GV use VR	Center
7. Reproduction f characteristic use VR	Center

〈CAUTIONS〉

If setting of the normal tape f characteristic use VR(10KΩ) and reproduction GV use VR (30KΩ) is changed, adjustment must be performed after setting the VR, on the side to Which the frequency counter is connected, at the center position.

3. Reproduction Frequency Characteristic(Normal)

1. Play 333Hz, −10VU(25mMAX) test tape and adjust the reproduction GV use VR (30KΩ) so that the reading becomes −15.5 dBm (130mV).
2. Play 8KHz, −10VU(25mMAX) test tape and adjust the normal f characteristic use VR (10KΩ) so that the reading becomes −15.5 dBm (130mV).
3. Repeat adjustments (1) and (2) 2～3 times so that both become −15.5dBm(130mV). Permissible level error is 333Hz - 8KHz ±3dB. (333Hz taken as 0dB).

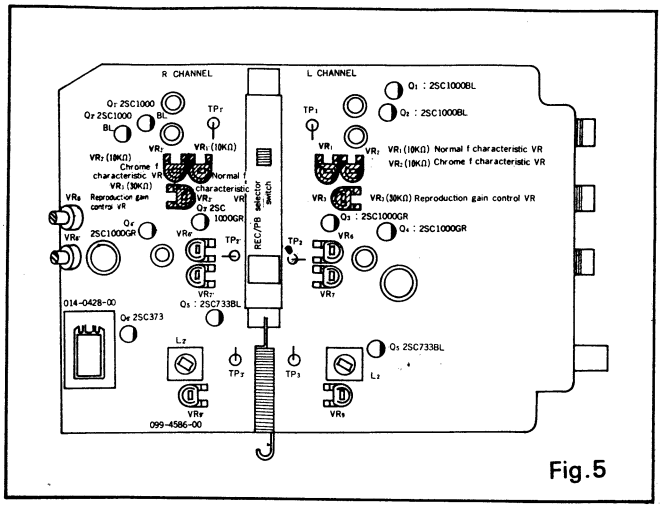


Fig.5

〈Connection Diagram〉 See Fig.2

〈Adjustment conditions〉

1. Mechanism operating button	PLAY
2. DOLBY NR	OFF
3. DNL	OFF
4. TAPE	Normal
5. LINE OUT control	MAX

4. Reproduction Frequency Characteristic (Chrome)

Play 8KHz, −10VU(25mMAX) test tape and adjust the chrome characteristic adjustment use VR(10KΩ) so that the reading becomes −20dBm(77.5mV).

Permissible level error is 333Hz, −8KHz − 4.5±3dB(333Hz taken as 0dB)

〈Adjustment point〉 See Fig.5
〈Connection diagram〉 See Fig.2
〈Measurement Conditions〉

1. Mechanism operating button	PLAY
2. DOLBY NR	OFF
3. DNL	OFF
4. TAPE	Chrome
5. LINE OUT control	MAX

5. Adjusting Reproduction Voltage Gain

Play 400Hz, 0VU(200nWb/m) test tape and adjust the reproduction gain control (30KΩ) so that the voltage at TP2(see Fig.5) becomes 580mV.

Clearance 400Hz……580mV ±1dB

〈Adjustment Conditions)

1. Mechanism operating button	PLAY
2. DOLBY NR	OFF
3. DNL	OFF
4. TAPE	Normal
5. LINE OUT control	MAX

6. Adjusting Meter Sensitivity

1. Make connections as shown in Fig.6, depress the REC button, feed 400Hz signal and adjust the LINE IN VR so that voltage TP2 (see Fig.5) becomes 580mV(−2.5dBm) ±0.1dB.
2. Adjust the meter sensitivity use VR (3KΩ) to set the pointer of the meter at +2dB (◘◘ position).
3. Play the test tape 400Hz, 0VU TEAC M TT-150 or equivalent in PLAY state and verify that pointer of the meter temperature.

Clearance 0VU+2dB

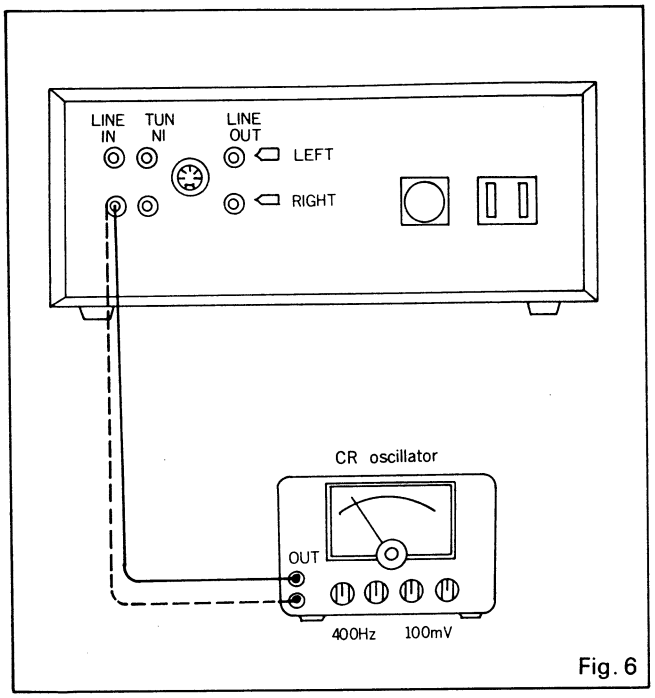


Fig. 6

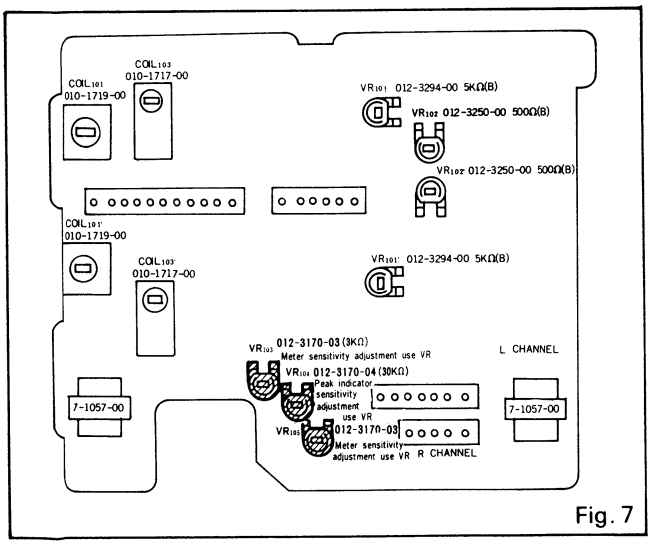


Fig. 7

〈Adjustment Conditions〉

1. DOLBY NR SW — OFF
2. DNL SW — OFF
3. LINE OUT control — MAX

CAUTION) Repeat alternately with peak indicator sensitivity adjustment 2~3 times.

7. Adjusting Peak Indicator Sensitivity

1. Make connections as shown in Fig.6, feed 1KHz signal to one channel(either LCH or RCH), and depress the REC button. Next adjust the LINE IN VR so that voltage at TP-2 or TP-2' becomes 730mV(−0.5dBm).
2. Set the peak indicator sensitivity adjustment use VR at the position where the lamp lights up. (See Fig.7)
3. Now feed input signal to the other channel and verify that the lamp lights up.

8. Adjusting Recording Bias Trap(REC AmP)

Adjusting recording bias current

1. Depress the REC button.
2. Adjust core of coil(010-1719-00) to obtain dip point(minimum level point) at TP3, TP3' (millivoltmeter C, D)
3. Adjust the semifixed VR 012-3278-00 (200KΩ) so that the voltage at TP1, TP1' becomes 5.0mV. (Millivoltmeter A, B)
4. Repeat (2) and (3) a few times so that,
   TP3, TP3'·····less than 35mV
   TP1, TP1'·····5.0mV
5. Since the voltage at TP1, TP1' is related to recording frequency characteristic, verify item(11).

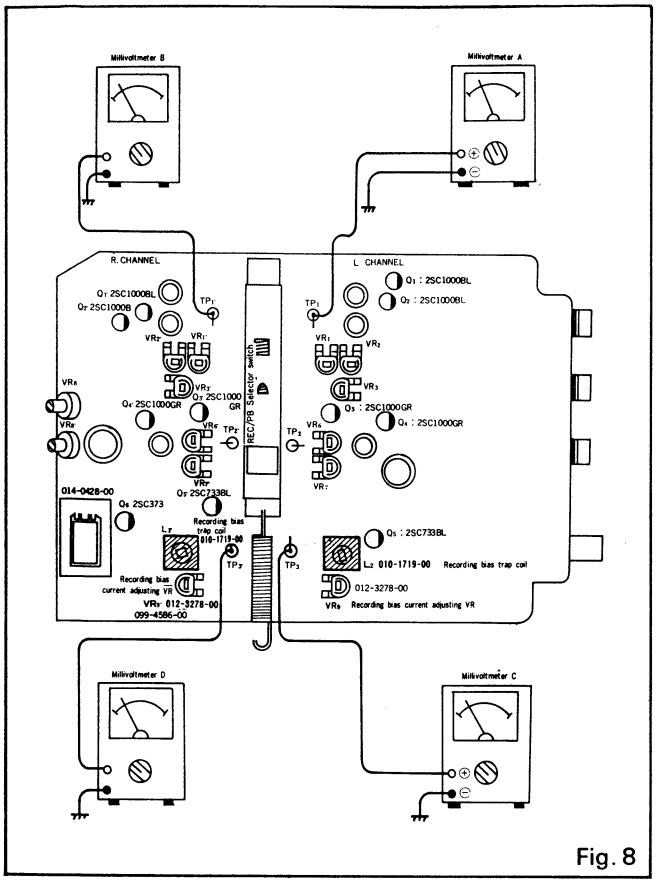


Fig. 8

〈Measurement Conditions〉

1. MIC volume	MIN
2. LINE IN control	MIN
3. Tape selector switch	Normal

9. Adjusting Recording Sensitivity(Normal Tape)

1. Feed 400Hz signal from the oscillator to LINE IN. (See Fig.6)
2. Set to REC state and set the tape selector at the Normal position.
3. Adjust the LINE IN VR so that the level of the 400Hz signal becomes 580mV ±0.1dB at TP2, TP2'.
   (However, MIC volume·····MIN
   LINE OUT control·····MAX)
4. Adjust the normal tape recording sensitivity adjustment use VR so that indication in the millivoltmeters C and D becomes 580mV (−2.5dBm).
5. Perform recording and reproduction operation using test tape BASF TP-18.
6. At this time, read the level indicated in the millivoltmeters C and D. If not 580mV (−2.5dBm), adjust the normal tape recording sensitivity adjustment use VR so that it becomes 580mV(−2.5dBm).
7. Again perform recording and reproduction using TP-18 and verify that the reproduction level at TP2 and TP2' is within 580mV± 1dB.

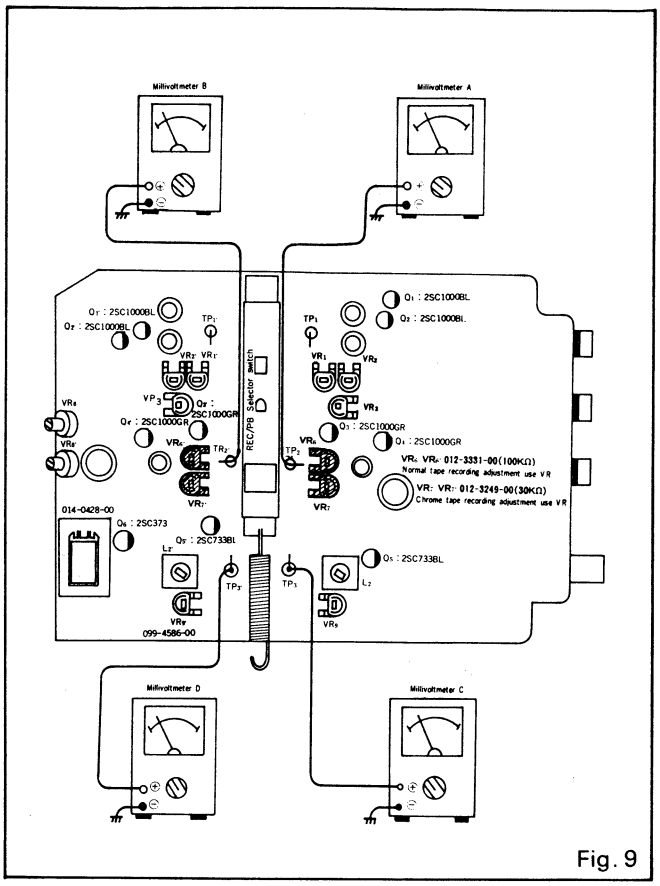


Fig. 9

〈Measurement Conditions〉

DOLBY NR SW	OFF
DNL SW	OFF
Tape selector SW	Normal

10. Adjusting Recording Sensitivity (Chrome Tape)

Use test tape(chrome tape) TDK KR-C-60 and adjust the chrome tape recording sensitivity adjustment use VR, follow order 9-(1) ~ 9-(6), so that the reproduction level at TP2 and TP2' becomes 580mV± 1dB.

〈Adjustment points and procedure〉

See Fig.6 and Fig.9.

〈Adjustment Conditions〉

DOLB NR SW	OFF
DNL SW	OFF
Tape Select SW	Chrome

11. Adjusting Recording Frequency Characteristic

1. Make connections as shown in Fig.6.
2. Set to REC state and set the tape selector SW at the Normal position.
3. Adjust the LINE IN control so that the signal level (333Hz) at TP2 and TP2' becomes 58mV ± 0.1dB (corresponding to −20VU recording level).
4. Record and reproduce using test tape BASF TP-18. Note the output level at TP2 and TP2' at this time.
5. Set the audio oscillator at 8KHz and verify that the level at these terminals is 58mV±0.1dB. (REC state).
6. Record and reproduce using test tape TP-18. At this time, the difference between this level and that of (4) (333Hz·····0dB) should be ±3dB.
7. If the difference between levels of (4) and (6) is more than ±3dB, connect millivoltmeter as shown in Fig.8 and adjust the semifixed VR 012-3278-00(200KΩ) so that indication in the millivoltmeter becomes as shown in the following table.

Level difference between(4)and(6)	Adjustment of semifixed VR 012-3278-00(200KΩ)
More than +3dB	So that indication becomes 6mV
Within ±3dB	As it is
More than −3dB	So that indication becomes 4mV

Where, level of 333Hz is taken as 0dB.

8. Again record 8KHz signal and verify that the level is within the level of(5).

〈Adjustment Conditions〉

1. DOLBY NR SW	OFF
2. DNL SW	OFF
3. Tape selector SW	Normal
4. MIC IN VR	MIN

12. Bias Trap(Dolby Circuit)

1. Depress the REC button.
2. Connect millivoltmeter to TP102 and TP102' and adjust the core of coil(010-1719-00).to obtain the dip point(minimum level point).

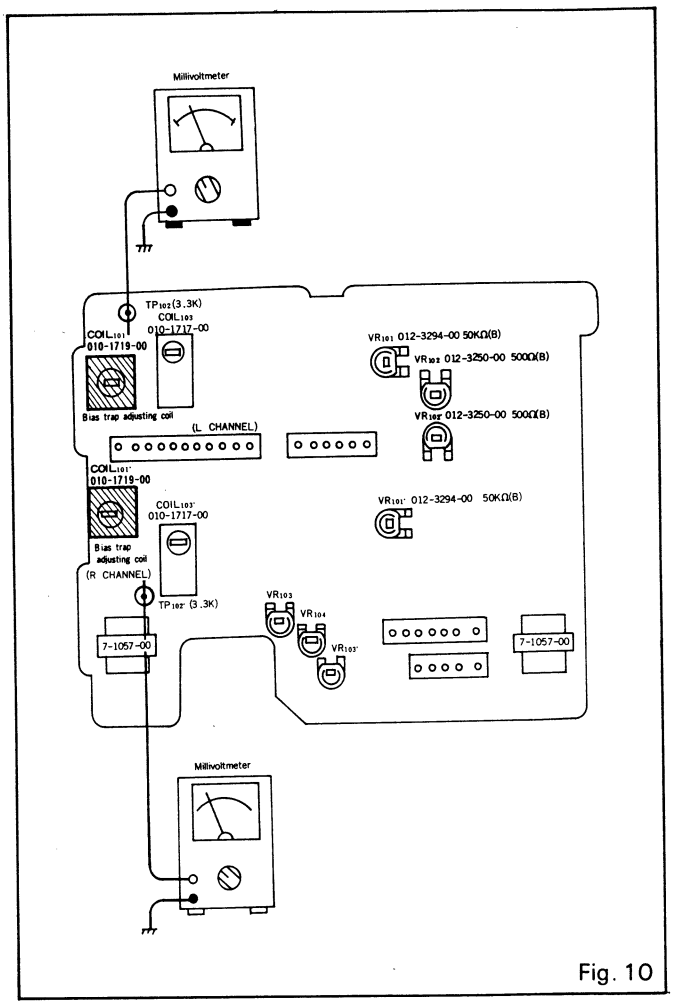


Fig. 10

〈Adjustment Conditions〉

1. MIC VR	MIN
2. LINE IN control	MIN

13. Adjusting 19KHz MPX Filter (Dolby Circuit)

1. Depress the REC button and set the LINE IN VR at MAX.
2. Feed 1KHz signal from OSC and adjust the output of the OSC so that indication in the millivoltmeter at TP103 and TP103' becomes 3dBm(775mV).
3. Change the signal to 19KHz and adjust the core of coil(010-1716-00) to obtain dip point (minimum level point) −30dB (24.5mV) below the 1KHz level. (LINE IN 1KHz and 19KHz input signal level must be the same)

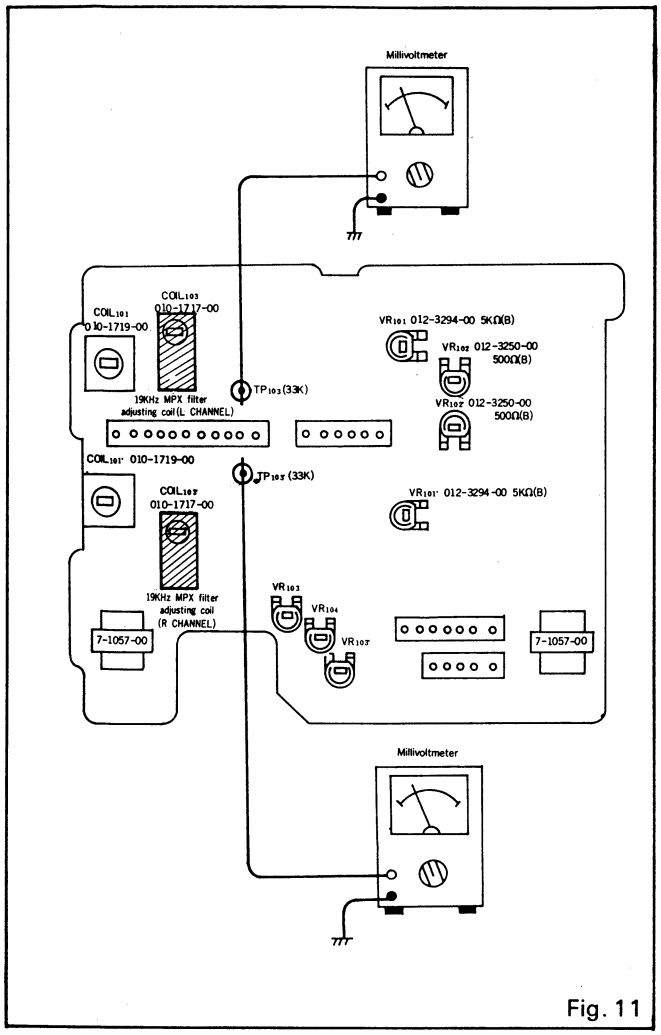


Fig. 11

14. Dolby Circuit GV(500Ω Semifixed VR)

Dolby Circuit LAW(5KΩ Semifixed VR)

1. Depress the REC button.
2. Turn 012-3294-00(5KΩ) counterclockwise. (As seen from parts side)
3. Turn the DOLBY NR SW off and connect TP105 and TP105' with the ground terminal.
4. Feed 5KHz signal from the OSC.
5. Connect millivoltmeter to TP2 and TP2' and adjust the LINE IN VR so that the voltage becomes 17.5mV.
6. Connect millivoltmeter to TP104 and TP104' and note the level(obtained at this time).
7. Turn ON the DOLBY NR SW and adjust 012-3250-00(500Ω) so that the 10dB ±0.25dB(55.3mV±0.25dB) level at TP104 and TP104' goes up with respect to(6).
8. Note the level of(7).
9. Disconnect TP105 and TP105' from the ground terminal and adjust 012-3294-00 (5KΩ) so that the level at TP104 and TP104' comes down by 2dB±0.25dB (44mV±0.25dB) with respect to(8).
10. Again connect TP105 and TP105' to ground and check if the signal level at TP104 and TP104' returns exactly to the level obtained in(8). If it does, disconnect TP105 and TP105' from the ground. However, if it does not return exactly to that level, repeat adjustments (6)~(9)and when the level exactly returns to that level, disconnect TP105 and TP105' from the ground.

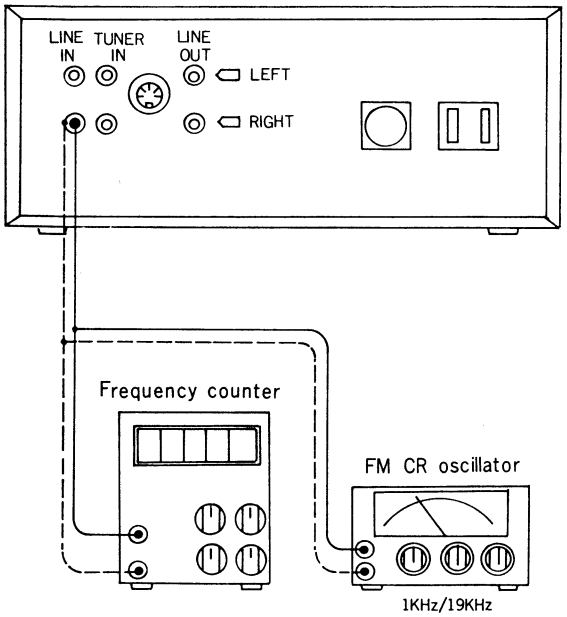


Fig. 12

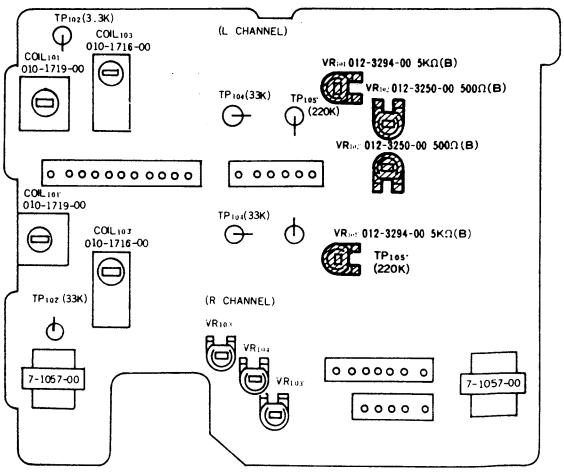


Fig. 13

15. Adjusting DNL

Run a blank tape(normal) in PLAY state and turn ON the SNL SW. (LINE OUT VR···MAX) Adjust the semifixed VR(012-2740-00) (10KΩ) on the DNL printed board so that the level becomes minimum. Adjust while listening to the hissing noise from the speaker so that the noise becomes minimum.

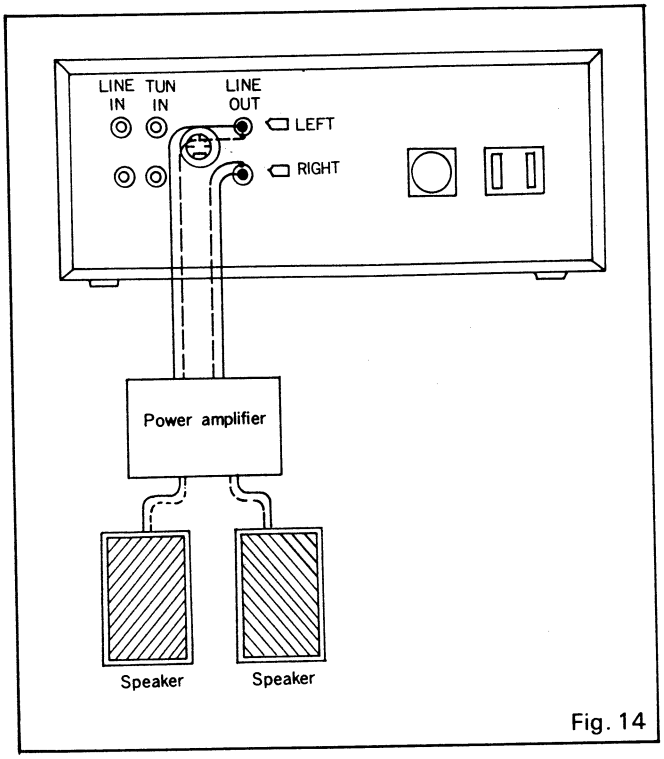


Fig. 14

〈Adjustment Conditions〉

DOLBY NR SW	OFF
Tape selector SW	Normal

—Tape Mechanism Section—

1. Adjustment of head azimuth→ refer to Electrical Section

2. Adjusting Pintch Roller Pressure(See Fig.15)

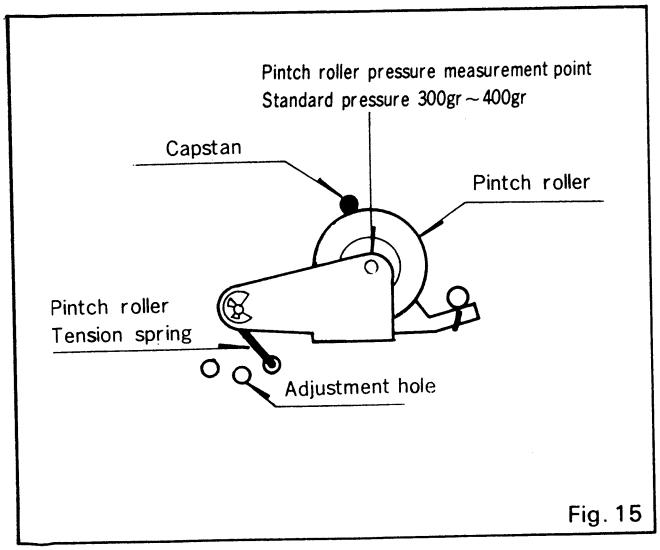


Fig. 15

3. Lock Shaft Adjusting Screw (See Fig.16)

Adjust by the lock shaft fixing screw in the following cases.

- When EJECT is possible in play state and FF · REW state.
- When EJECT is not possible.

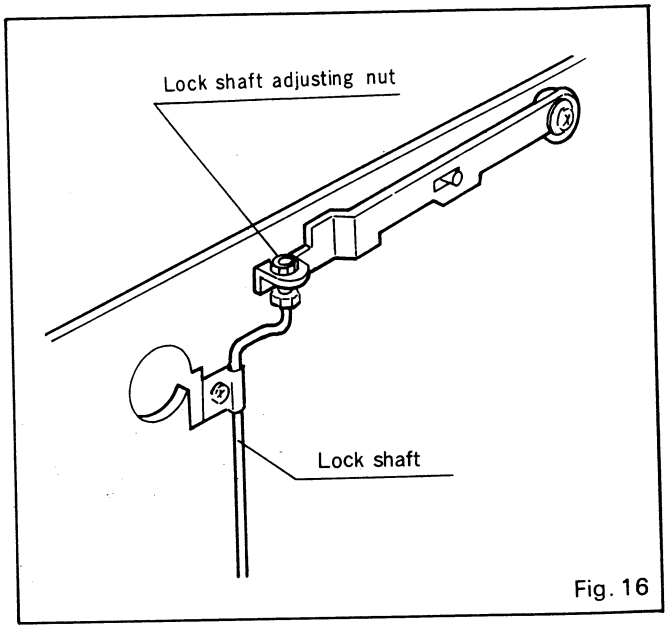


Fig. 16

4. Adjusting play Smitch(See Fig.17)

- When play plunger does not lock

Check if the plate switch is securely operating, adjust the position of the actuator operation use plate spring of the play switch.

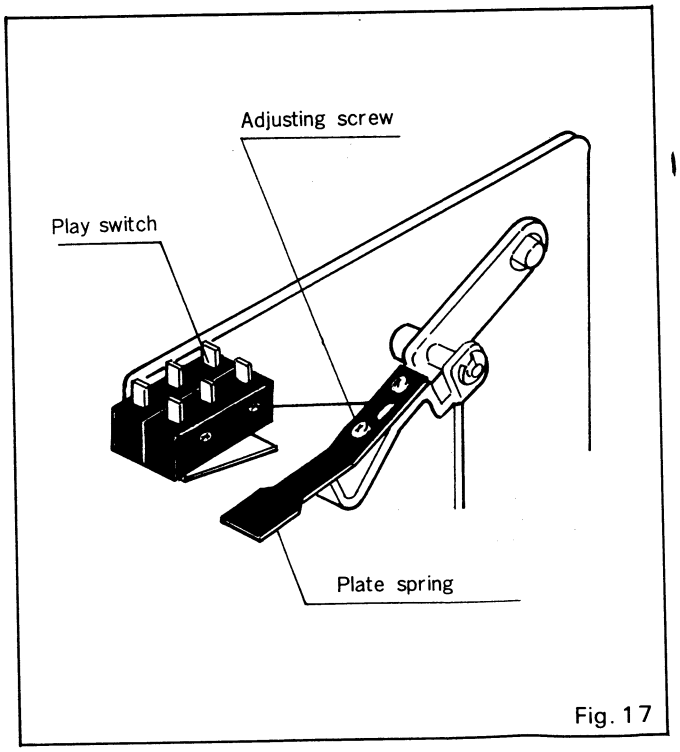


Fig. 17

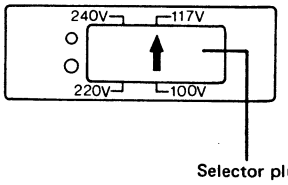
■INSPECT POWER SUPPLY VOLTAGE

A voltage selector plug provided on this set allows adjustment for operation from AC 117V, 220V, and 240V power sources. Since this set has been preadjusted for AC 240V at time of shipment, if using it in an area where the local AC line voltage differs, be sure to change the voltage selector plug setting to match the employed voltage.

Voltage Selection

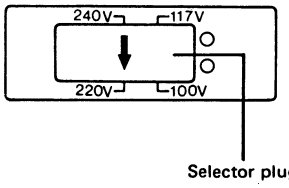
Remove the protective cover from the rear panel and pull out the voltage selector plug. Align the arrow marking of the plug with the employed voltage indication and reinsert it. For safety reasons, replace the protective cover after selecting the voltage.

117 V locations

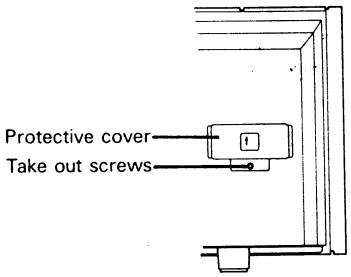


Selector plug

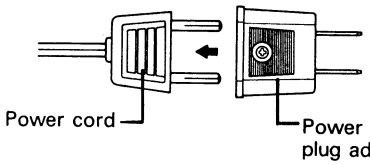
220 V locations



Selector plug

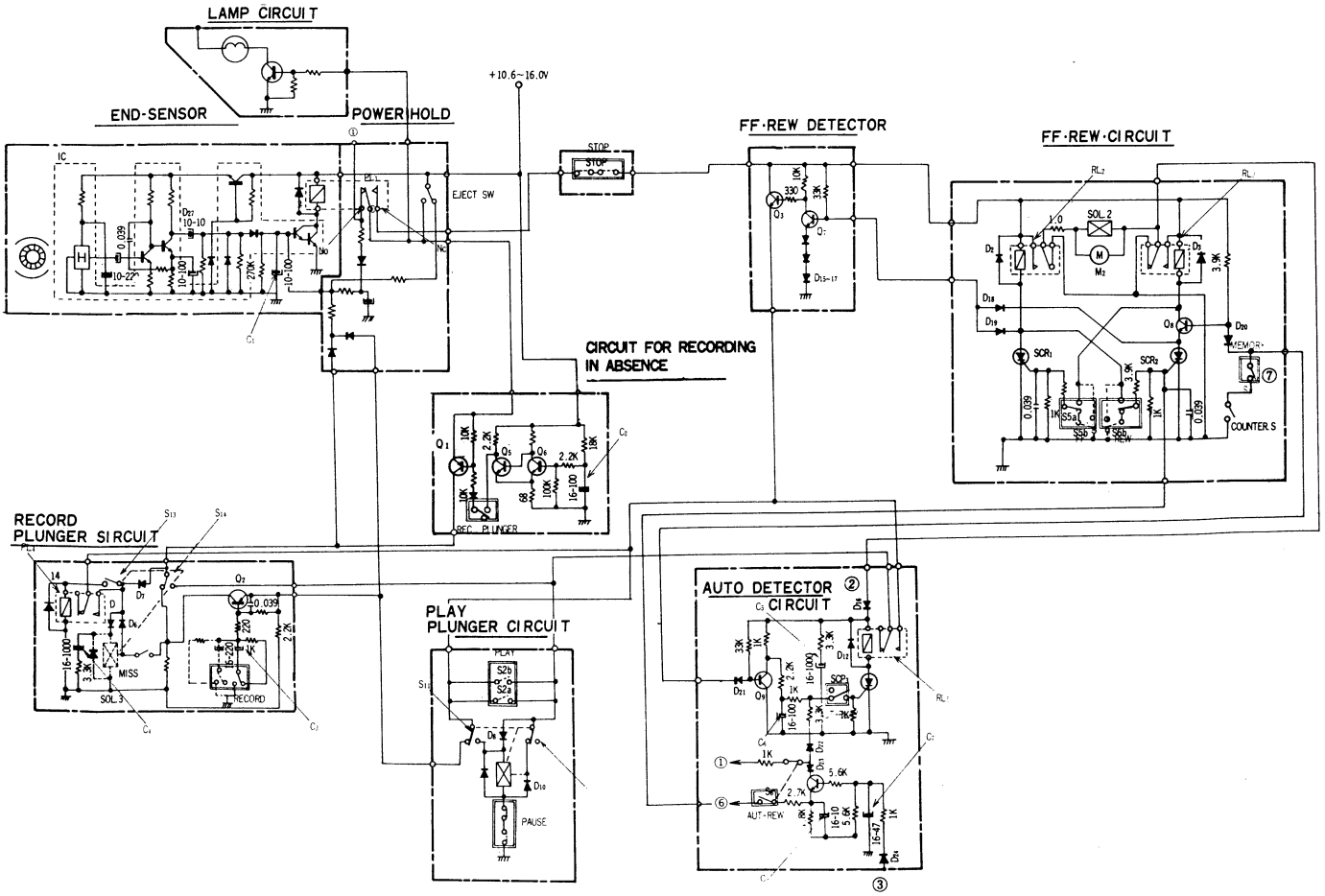


When using the set in 117V locations, attach the accessory adapter to the power cord plug.



■OPERATION OF TAPE MECHANISM CONTROL CIRCUIT

(Tape Mechanism Control Circuit Troubleshooting)



1. End Sensor

The end sensor controls each operation of the mechanism.

Power to all the circuits, except the eject and lamp circuit, is supplied thorugh the end sensor.

The end sensor employs a Hall-IC(Hall effect) Magnetic lines of force are cut by rotation of a magnet(10 poles) connected with the take-up reel, the voltage thus produced in the Hall-IC is amplified, rectified and integrated and a relay is controlled through a transistor.

1) When the power switch of the set is turned ON, the control transistor operates by the NC contact of relay RL1 and the relay turns ON. After that the relay is held by lines A and B.
2) If PLAY or REC PLAY operation is performed in this state, the PLAY plunger switch S11 switches over to the dotted-line side and since line B is disconnected, self hold of RL1 is released and if the magnet rotates, RL1 is held by the output of the Hall-IC. Moreover, in the case of FF, REW, lines A and B are disconnected by means of the priority circuit and the relay is held only by the output of the Hall-IC.
3) Next when tape end is reached at PLAY, REC. PLAY, FF, REW, the Hall-IC output disappears, the relay turns OFF after C1 has discharged and the mechanism stops.
4) After that the relay again turns ON, same as in 3), and waits(stand-by) for the next operation.
5) Again, since pulse is generated at the NC side of RL1 according to 3) and 4), this is used to perform the AUTO PLAY and AUTO REW operations.

2. PLAY Plunger Circuit

After the plunger has been sucked it is self held in order to prevent burning of the plunger when the PLAY button is continuously depressed. Moreover, recording by mistake during PLAY is prevented and self hold of the end sensor relay RL1 is released and the relay is held by the Hall-IC.

1) When the PLAY button S2 is depressed in the STOP or REC state, a large amount of current flows through the plunger middle point and suction takes place.
2) After suction, the plunger switchs S11 and S12 switch over to the dotted-line side.
3) Burning of plunger when the PLAY button is continuously depressed is prevented by S12.
4) By S11 the plunger is self-held, line B is disconnected and recording is not made even when the REC button is depressed.

3. REC Plunger Circuit

Control for preventing the plunger from burning when the REC button is continuously depressed is accomplished by a transistor. In the case of REC-PLAY→STOP, the click sound is eliminated by delaying release of the REC plunger and switching the amplifier REC/PLAY switch after muting has been completed.

1) If the REC button S3 is depressed when voltage is being applied to line B, base current flows in Q2 through C3, Q2 turns ON and the plunger is sucked. When C3 charges, Q2 turns OFF and there is no risk of burning the plunger even when S3 is continuoulsy depressed.
2) When the REC plunger turns ON, the relay turns ON through the interlocked switch S13 and the REC plunger is held.
3) In the case of REC → STOP, the relay immediately turns OFF but release of the REC plunger is delayed by C4.

4. FF, REW Circuit

The FF use motor and brake plunger are controlled by 2 relays and a SCR. The motor is bidirectional and the polarity for FF and REW is determined by means of a relay.

1) When the FF button S5 is depressed, voltage is applied to the gate of SCR1 through the coil of relay RL3, SCR1 fires, PL2 turns ON and FF is performed.
2) At this time, if the REW button S6 is depressed, since SCR1 is ON and its anode voltage is low(less than 1V), SCR2 is not triggered and REW is not performed.
3) However, when the REW button S6 is depressed in state other than FF, SCR2 fires→RL3 turns ON→and REW operat tion is performed, same as in 1).
4) As in 2), FF operation is not accomplished when the FF button S5 is depressed during REW.
5) Q8 performs memory stop operation. Refer to 1), 3).

5. FF, REW Priority Circuit

In order to protect the tape, REC and PLAY are unabled at the time of FF or REW. Moreover, self hold of the end sensor relay is released and the relay is held by the Hall-IC.

1) At the time of FF or REW, SCR1 or SCR2 turns ON and its anode voltage becomes low.
2) At this time, base potential of Q7 also decreases by D18 and D19 and Q3 is cut off.

6. Circuit for Recording in Absence

Approx. 1sec pulse is generated simultaneoulsy with power ON and the REC plunger and PLAY plunger are operated. After that, they are held via the end sensor.

1) When power is turned on, Q5 and Q1 turn ON and Q6 turns OFF during the period C2 is charged, first the REC plunger is sucked and then the PLAY plunger is also sucked by means of the interlocked switch S14.
2) When charging of C2 finishes and the potential becomes high, Q6 turns ON, Q5 and Q1 turn OFF and the pulse stops but each plunger is held through the end sensor circuit.

7. Memory Stop

The tape counter has a built-in switch which shorts at 900~999. At this time, the REW relay turns OFF and the mechanism stops.

1) When REW is accomplished by turning ON the memory switch S10, ⑦ gets grounded when the counter scale reaches 999~997.
2) At this time, Q8 turns off, the REW relay TL3 tunrs OFF and the mechanism stops.

8. Auto Rewind

An electrolytic capacitor is kept charged during PLAY and the SCR of REW is triggered when the pulse of end sensor is fed.

1) During PLAY, C7 is charged through ③.
2) When the end sensor operates at tape end, pulse is generated in 1).
3) At this time, since Q10 is biased by C7, emitter potential of Q10 rises, pulse is generated in ⑥ also, SCR2 fires and REW is accomplished.

9. Auto Play

An electrolytic capacitor is kept charged during REW, and when the pulse of end sensor is added to this, the Auto Play use relay is operated and the Play plunger is sucked.

1) During REW, C5 is charged through ②.
2) When the end sensor operates at tape end, pulse is generated in ①.
3) Since C5 is charged, SCR3 is triggered, relay RL5 turns ON and the Play plunger operates.

10. Memory Stop + Auto Play

An electrolytic capacitor is kept charged during REW, pulse is generated at memory stop, Auto play use relay is operated and the plunger is sucked.

1) During REW, C5 is charged through ②.
2) At memory stop, ⑦ gets grounded and Q9 is cut off.
3) At this time, SCR3 is triggered by rise of potential at the collector of Q9, relay RL5 turns ON and the play plunger operates.

—Troubleshooting of Tape Mechanism Control Circuit—

1. Method of Checking Faulty Points

1) Verify by operating each operating button that the operation is being performed normally.
2) After verifying by 1), refer to the wiring diagram of each block and locate the faluty block.
3) Verification of difference with the voltage and current values in the diagram and check of faulty parts is performed based on verification by 2), control circuit, discription of each operation.

■TROUBLESHOOTING

—Electrical Circuit—

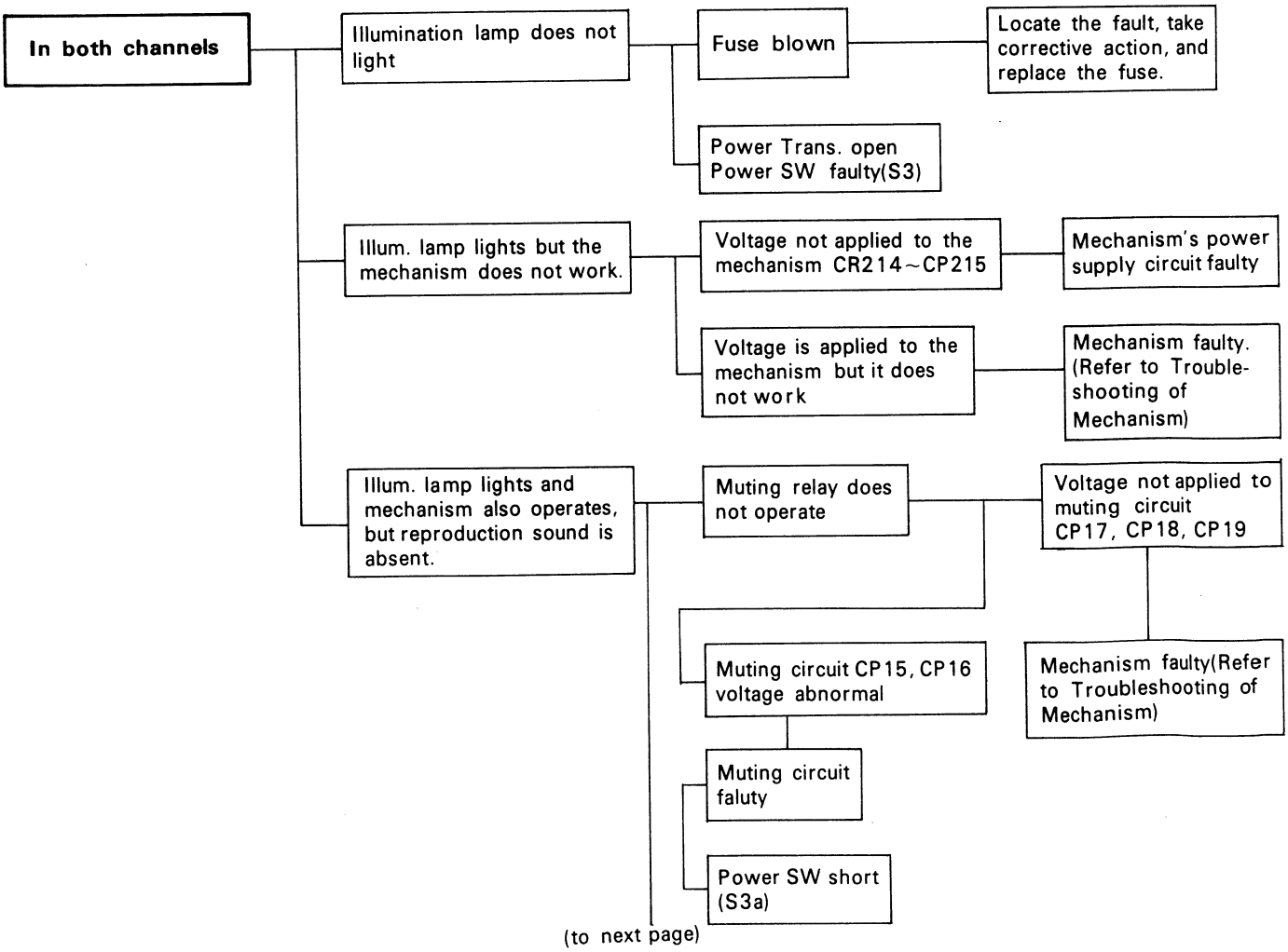
Troubleshooting Procedure

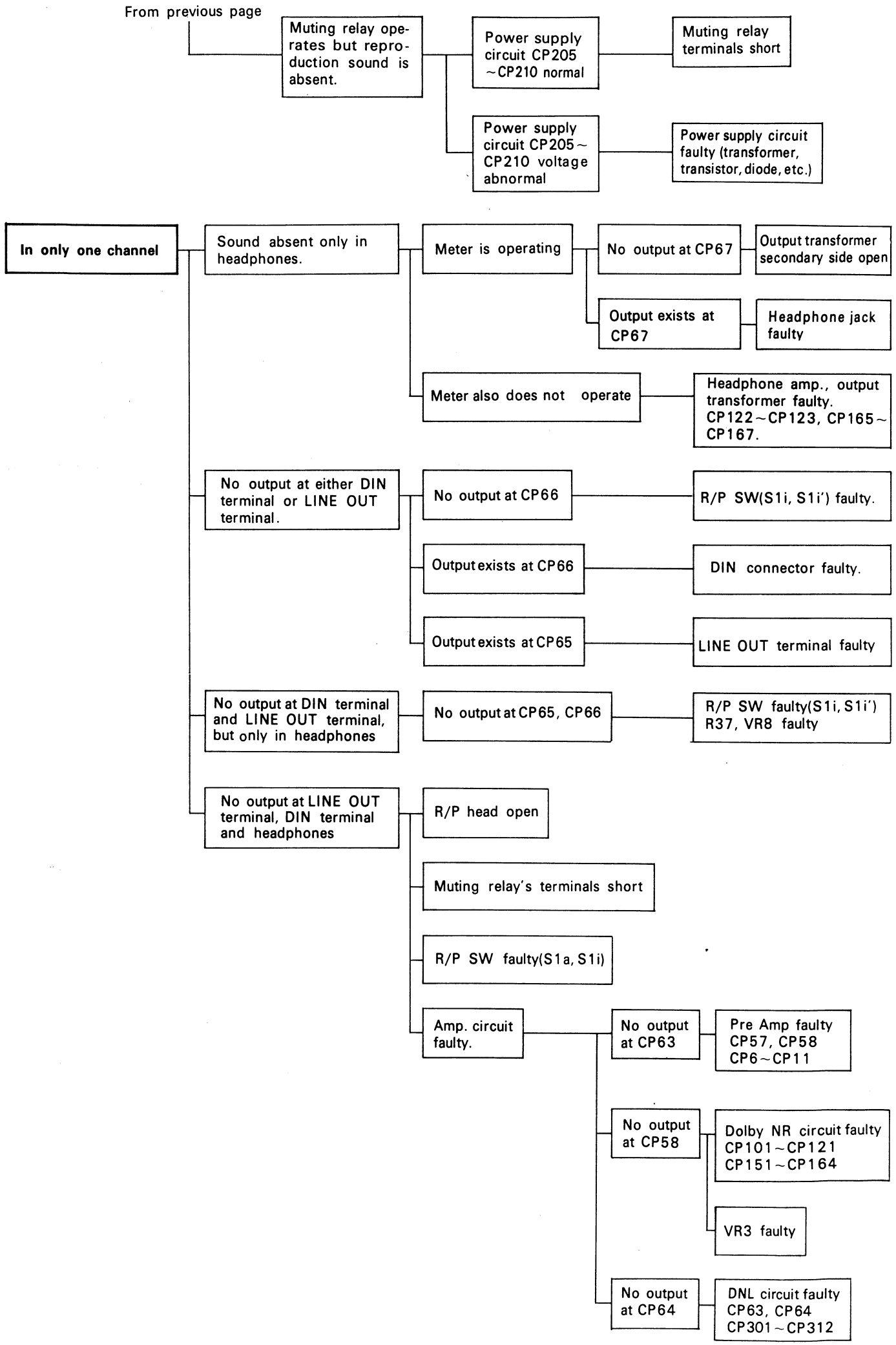
1. First of all locate the faulty point according to the symptom of the fault.
   →Troubleshooting Chart
2. Next measure voltage at check points(CP) and locate the faulty point or faluty part.

Conditions for the following troubleshooting.

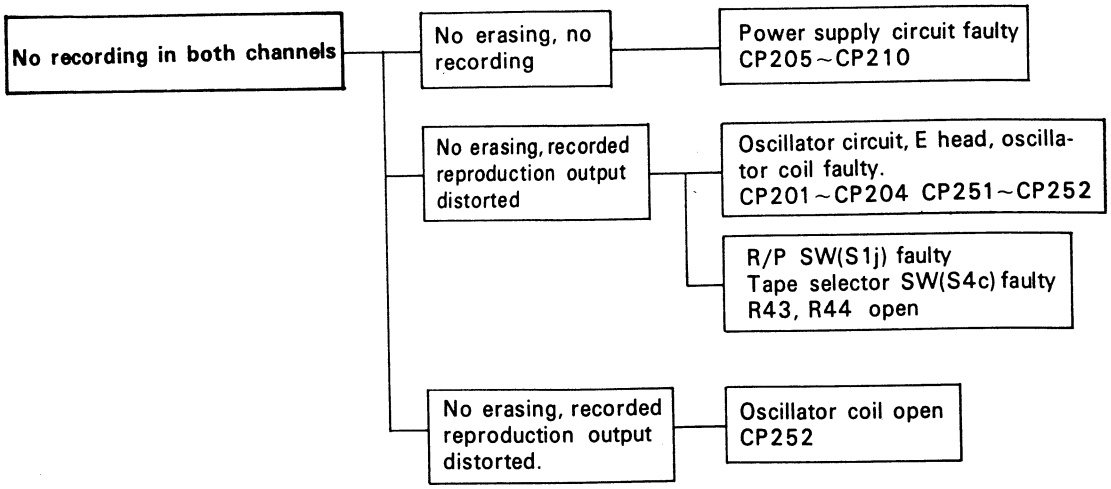
1) There is only one fault.
2) Mechanism is operating normally.
3) The primary side power voltage selector must be set to the specified voltage and must be in normal condition.
4) Externally connected equipments are normal and the cassette tape is also normal.
5) Wiring and PWB are normal and troble is developed in an electrolyaal part. c
6) LINE IN VR, MIC IN VR, LINE OUT VR is not at MIN.

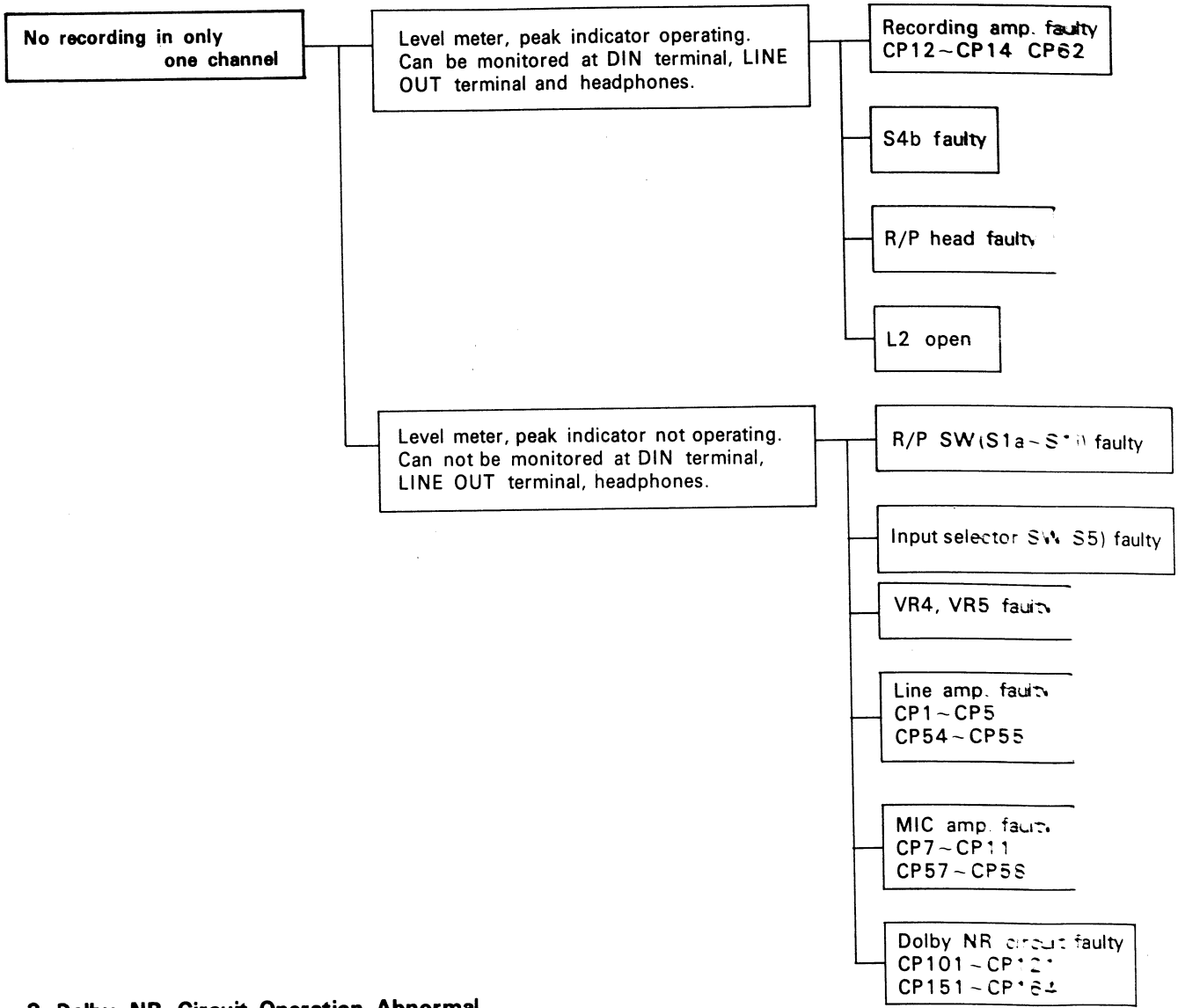
1. Reproduction sound not put out


In both channels
Illumination lamp does not light
Fuse blown
Locate the fault, take corrective action, and replace the fuse.
Power Trans. open
Power SW faulty(S3)
Illum. lamp lights but the mechanism does not work.
Voltage not applied to the mechanism CR214~CP215
Mechanism's power supply circuit faulty
Voltage is applied to the mechanism but it does not work
Mechanism faulty. (Refer to Trouble-shooting of Mechanism)
Illum. lamp lights and mechanism also operates, but reproduction sound is absent.
Muting relay does not operate
Voltage not applied to muting circuit CP17, CP18, CP19
Muting circuit CP15, CP16 voltage abnormal
Mechanism faulty(Refer to Troubleshooting of Mechanism)
Muting circuit faluty
Power SW short (S3a)
(to next page)

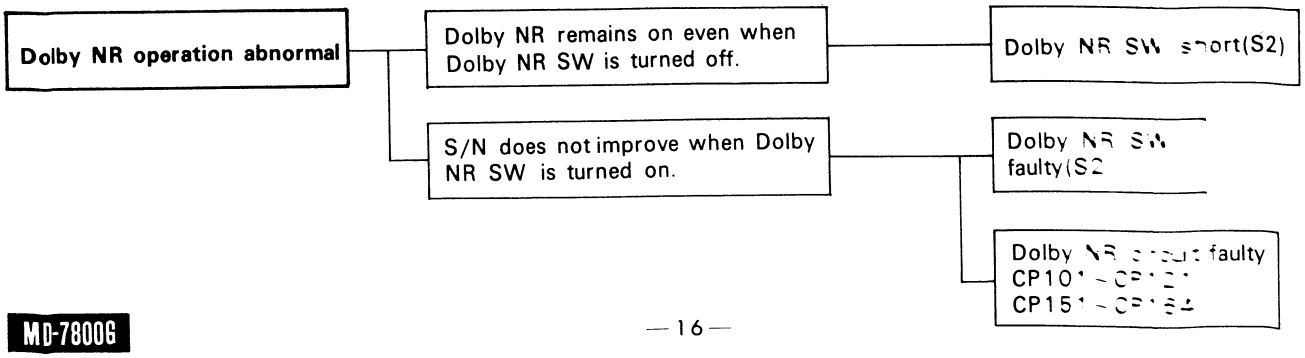

From previous page
Muting relay operates but reproduction sound is absent.
Power supply circuit CP205 ~CP210 normal
Muting relay terminals short
Power supply circuit CP205~ CP210 voltage abnormal
Power supply circuit faulty (transformer, transistor, diode, etc.)
In only one channel
Sound absent only in headphones.
Meter is operating
No output at CP67
Output transformer secondary side open
Output exists at CP67
Headphone jack faulty
Meter also does not operate
Headphone amp., output transformer faulty. CP122~CP123, CP165~ CP167.
No output at either DIN terminal or LINE OUT terminal.
No output at CP66
R/P SW(S1i, S1i') faulty.
Output exists at CP66
DIN connector faulty.
Output exists at CP65
LINE OUT terminal faulty
No output at DIN terminal and LINE OUT terminal, but only in headphones
No output at CP65, CP66
R/P SW faulty(S1i, S1i') R37, VR8 faulty
No output at LINE OUT terminal, DIN terminal and headphones
R/P head open
Muting relay's terminals short
R/P SW faulty(S1a, S1i)
Amp. circuit faulty.
No output at CP63
Pre Amp faulty CP57, CP58 CP6~CP11
No output at CP58
Dolby NR circuit faulty CP101~CP121 CP151~CP164
VR3 faulty
No output at CP64
DNL circuit faulty CP63, CP64 CP301~CP312

2. No Recording

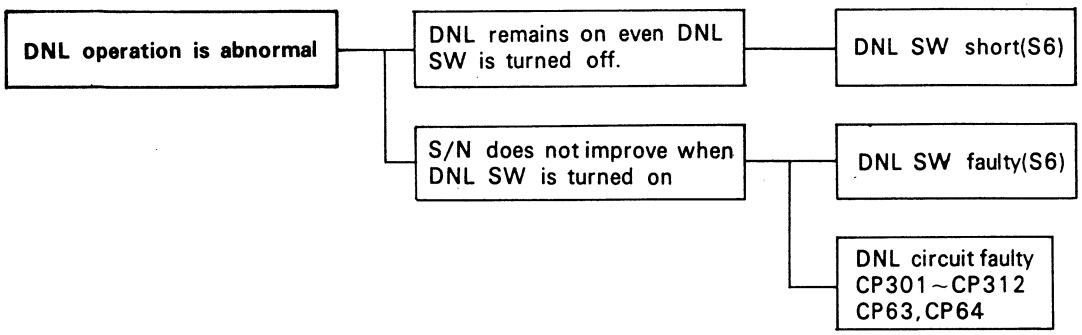




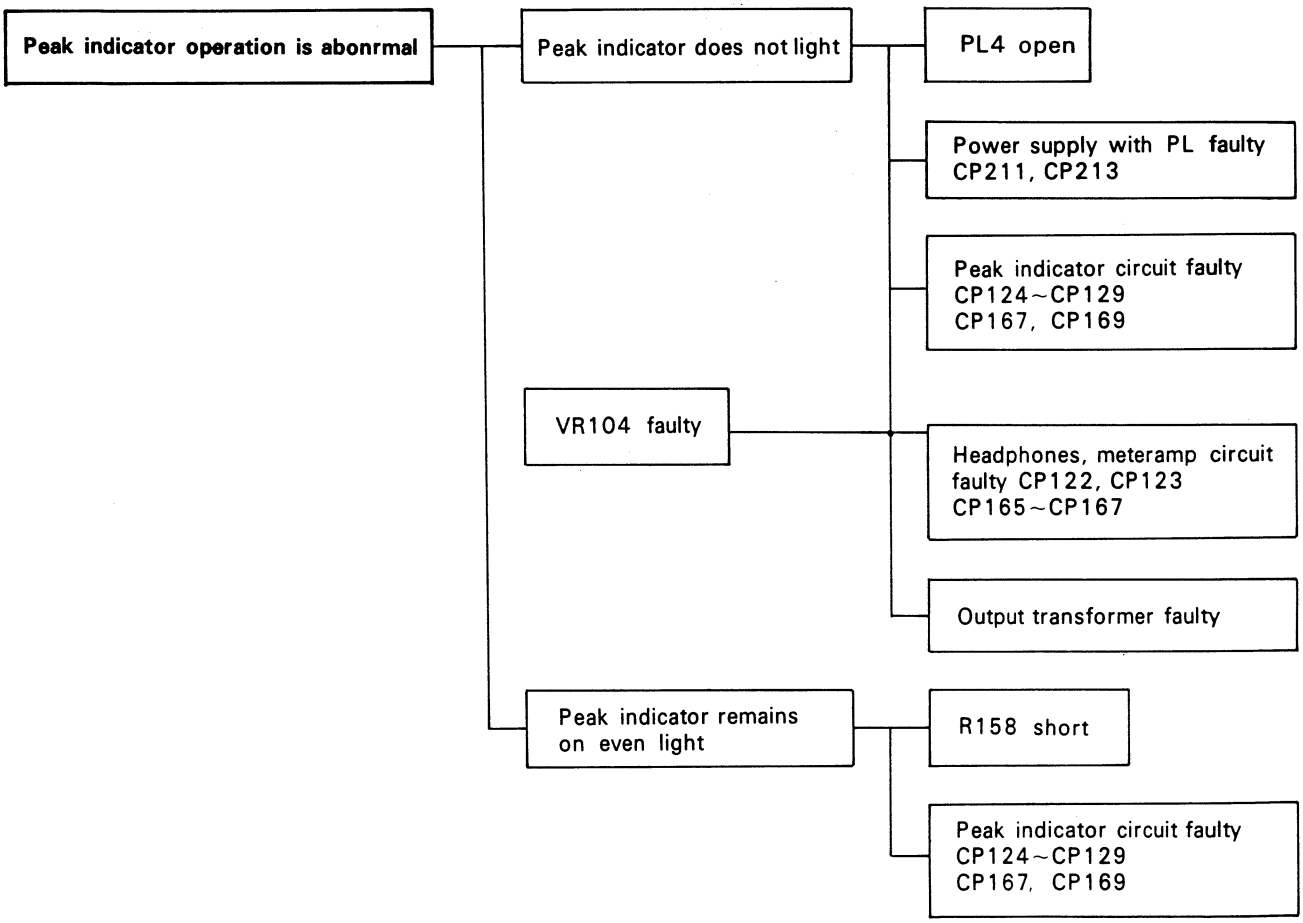
3. Dolby NR Circuit Operation Abnormal


Dolby NR operation abnormal
Dolby NR remains on even when Dolby NR SW is turned off.
Dolby NR SW short(S2)
S/N does not improve when Dolby NR SW is turned on.
Dolby NR SW faulty(S2)
Dolby NR circuit faulty
CP101~CP124
CP151~CP164

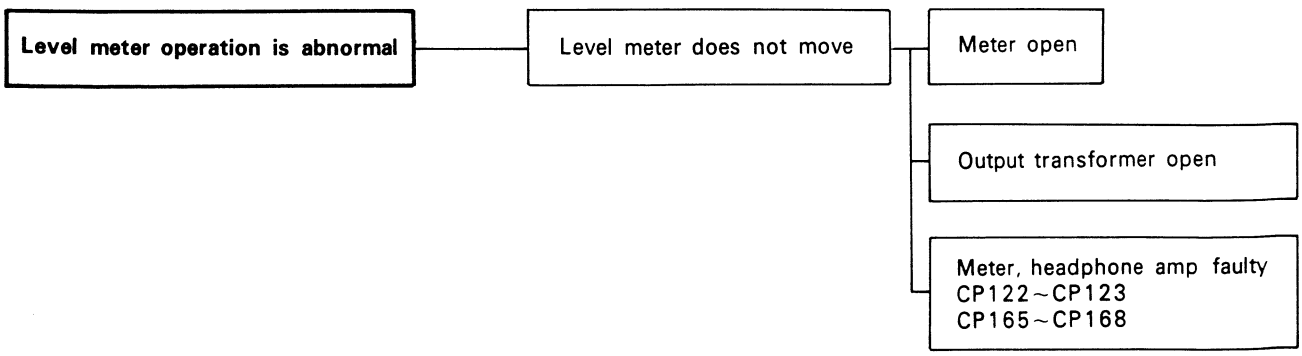
4. DNL Operation Abnormal


DNL operation is abnormal
DNL remains on even DNL SW is turned off.
DNL SW short(S6)
S/N does not improve when DNL SW is turned on
DNL SW faulty(S6)
DNL circuit faulty
CP301~CP312
CP63, CP64

5. Peak Indicator Operation Abnormal



6. Level meter Operation Abnormal



—Tape Mechanism Section—

1. Various Operating Sections

Fault	Symptom	Fault, Cause	Corrective Action
1—1 PLAY System Repairing Procedure	PLAY not possible (Head plate does not rise)	a. Plunger(suction force insifficient) b. Lever A.Ass'y sleeve bent c. Deck plate Ass'y link shaft B bent d. Guide plate Ass'y mounting faulty	Replace Replace Adjust, replace Adjust
	PLAY state not held	a. Plunger(suction force insufficient) b. Switch link timing	Replace Adjust
	AUTO STOP OK, counter operation OK, capstan rotation OK	a. Control circuit faulty	
	AUTO STOP OK, capstan rotation OK, counter does not work	a. Tape take-up torque of reel base insufficient (Reel base does not rotate) (Ⅰ) Reel base torque insifficinet(30~60g-cm) (Ⅱ) Idler pressure faulty (Spring pressure faulty) (Spring detached) (Ⅲ) Idler slip due to adrasion (Ⅳ) Pulley and bearing jammed (Ⅴ) Head plate stroke faulty — Stroke faulty(spring fatigue)	Replace Replace Adjust Clean, replace Replace Replace
		b. Belt slip due to expansion, abraision c. Pinch roller spring detached, fatigued	Replace Adjust, replace
	AUTO STOP OK, counter does not work, capstant does not rotate	a. Motor faulty b. Belt detached, slips due to expansion	Replace Replace
1—2 FF system, RE system (Specification) C—60 Tape Start → End Less than 90sec Repairing Procedure	AUTO STOP OK, counter operation OK	a. Control circuit faulty	
	AUTO STOP OK, counter does not work	a. Reel base tape take-up torque faulty (Reel does not rotate) (Ⅰ) Reel base torque faulty (60g-cm~90g-cm) (Ⅱ) Idler FF pulley Reel base dirty, slips due to abraision (Ⅲ) FF pulley A screw loose (Ⅳ) Belt slips due to expansion, abraision (Ⅴ) Motor faulty(torque faulty) (Ⅵ) Motor pulley loose	Replace Clean, replace Adjust Replace Replace Replace

Fault	Symptom	Fault, Cause	Corrective Action
Repairing Procedure ↓		b. Brake touches with reel base (I) Brake plunger faulty (suction force insufficient) (II) Brake plate does not rise ↑ Lock shaft } deformed Lock plate }	Replace Adjust, replace
		c. Head plate does not return (return spring fatigued)	Replace
1–3 STOP system PAUSE system Repairing Procedure	PLAY → PAUSE STOP not possible (TAPE is running) TAPE forced out	a. Head plate does not return (return spring fatigued) b. Control circuit faulty	Replace
1–4 BRAKE system Repairing Procedure	PLAY FF. REW → STOP Tape slackened	a. Spring fatigued, deteched b. Lock lever, lock shaft stuck up	Adjust, replace Adjust

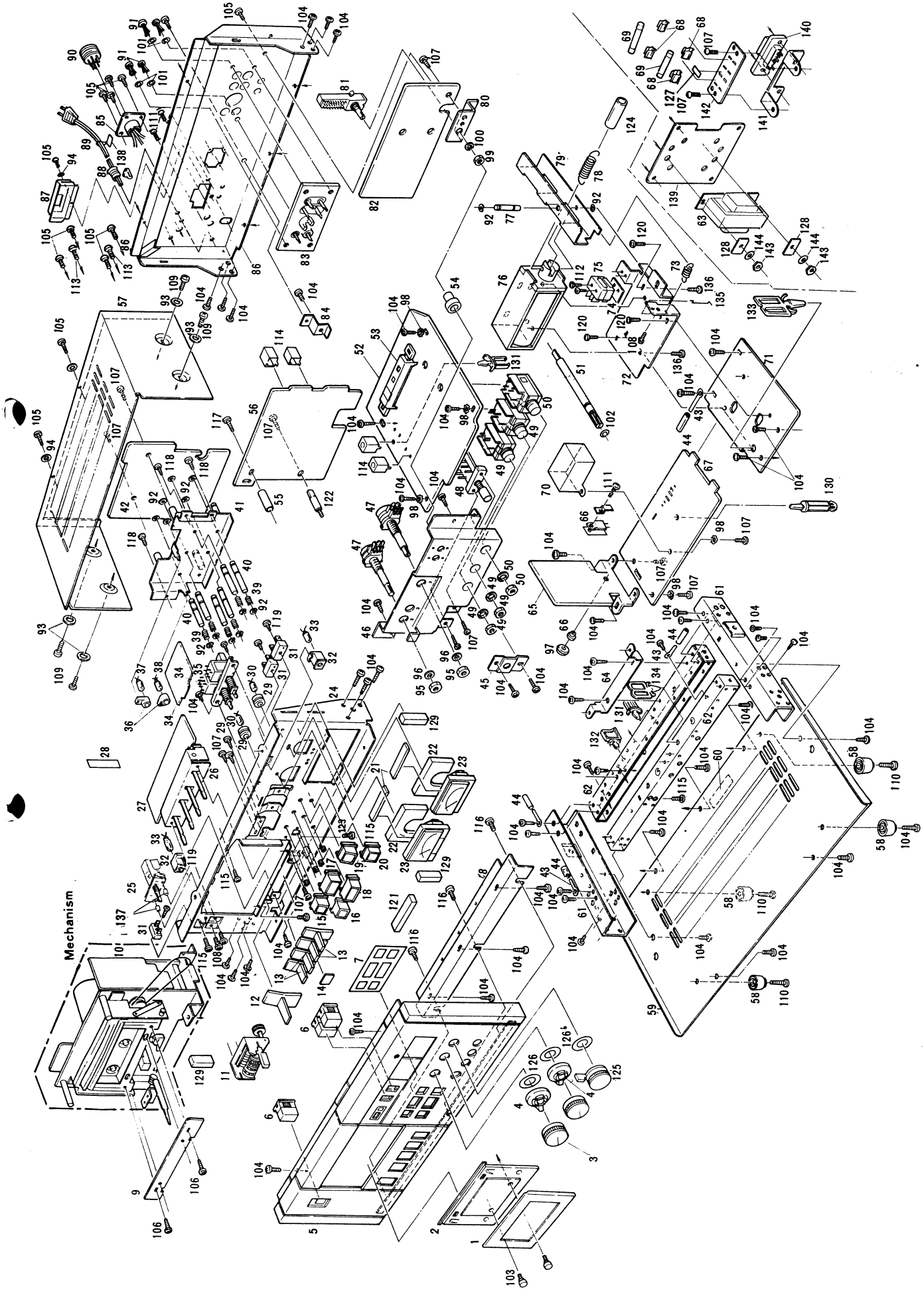
2. Characteristic

Symptom	Fault, Cause	Method of Checking	Corrective Action
2–1 WOW faulty	Belt dirty	Visual	Clean, replace
	Belt distorted(twisted)	Visual	Adjust
	Belt slackened, expanded	Visual(belt vibration, flywheel rotation) By listening(tape speed)	Replace
	REC. PLAY head dirty	Visual	Clean
	Capstan dirty	Visual	Clean
	Pinch roller dirty	Visual	Clean
	Pinch roller jammed	Visual. Check by manually turning the roller	Replace
	Pinch roller pressure faulty (Spring fatigued, detached)	Roller pressure. more than 200g (Check by tension gauge)	Replace tension spring, adjust
	Capstan and bearing jammed	Visual. Check by manually turning the flywheel Check motor current At play → less than 150mA	Replace housing and flywheel
	Capstan bent	Visual	Replace
	Bearing(housing) worn	Visual	Replace

Symptom	Fault, Cause	Method of Checking	Corrective Action
	Tape running faulty	Check tape running	Adjust R/P head azimuth
	Idler dirty, worn	Visual	Clean, replace
	Reel shaft collapsed	Visual	Replace base Plate
	Reel base torque uneven(At PLAY)	Check by torque gauge. Torque fluctuation → less than 6 g-cm	Replace reel base
	Reel base torque up(At PLAY)	Check by torque gauge Torque→30g-cm~60g-cm	Replace reel base
	Motor pulley dirty	Visual	Clean
	Motor faulty	Check motor current At PLAY → less than 150mA	Replace
	Pulley and bearing jammed	Visual. Check by manually rotating the pulley	Replace
	Motor pulley loose	Check manually	Replace

■EXPLODED VIEW:

◎Main Section



■ PARTS LIST:

◎Main unit section

NOTE: ★ Rank according to probability of faulty

REF.NO.	PART NO.	DESCRIPTION	★ Rank
1	371-2602-00	Trim plate	
2	335-0832-00	Molded part	
3	380-3580-00	Knob	2
4	380-3579-00	Knob	2
5	940-2340-01	Escutcheon assy	
6	382-0104-00	Button	3
7	353-0091-00	Shade	
8	330-5821-00	Pressed part	
9	330-5885-00	Pressed part	
10	930-0440-01	Tape mechanism assy	
11	023-0006-00	Counter	3
12	380-3581-00	Knob	2
13	380-3562-00	Knob	2
14	347-0590-00	Paper part	
15	380-3578-01	Knob	2
16	380-3578-03	Knob	2
17	380-3577-00	Knob	2
18	380-3577-01	Knob	2
19	380-3578-00	Knob	2
20	380-3578-02	Knob	2
21	375-0579-00	Pilot lamp accessory	
22	345-2704-00	Rubber part	
23	022-0030-00	Meter	3
24	309-0275-03	Front plate	
25	013-3289-00	Switch	2
26	013-3281-00	Switch	2
27	099-4592-00	PWB	
28	347-0603-00	Paper part	
29	345-2626-00	Rubber part	
30	017-0320-06	Pilot lamp	1
31	073-0400-00	Terminal	
32	345-2666-00	Rubber part	
33	017-0320-07	Pilot lamp	1
34	099-4588-00	PWB	
35	013-3277-00	Switch	2
36	345-2515-00	Rubber part	
37	017-0320-08	Pilot lamp	1
38	017-0320-09	Pilot lamp	1
39	750-1743-00	Spring	
40	341-1123-00	Machined part	
41	330-5876-00	Pressed part	
42	099-4591-00	PWB	
43	330-4662-00	Pressed part	
44	820-4025-03	Vinyl-tube	
45	330-5883-00	Pressed part	
46	330-5886-00	Pressed part	
47	012-3503-00	Variable resistor	2
48	013-3276-00	Switch	2
49	075-0120-00	Jack	
50	075-0121-00	Jack	
51	341-1125-00	Machined part	
52	099-4586-00	PWB	
53	013-3275-00	Switch	2
54	345-2540-00	Rubber part	
55	340-0394-00	Spacer	
56	099-4587-00	PWB	
57	310-0857-00	Upper case	
58	335-0805-00	Molded part	
59	311-0890-00	Lower case	
60	347-0337-00	Paper part	
61	312-0154-02	Chassis	
62	312-0155-01	Chassis	
63	008-0671-00	Power-trans	3
64	330-5877-00	Pressed part	
65	313-0944-00	Heat sink	
66	103-0234-25	Transistor (2SD234Y)	1
67	099-4589-00	PWB	
68	077-0071-01	Fuse receptacle	
69	120-0003-00	Fuse (0.3A)	1
70	330-5881-00	Pressed part	
71	330-5880-00	Pressed part	
72	330-5938-00	Pressed part	
73	750-1745-00	Spring	
74	347-0604-00	Paper part	
75	013-2690-02	Switch	2
76	015-0211-00	Plunger	2
77	341-1124-00	Machined part	
78	750-1744-00	Spring	
79	330-5879-00	Pressed part	
80	330-5882-00	Pressed part	
81	013-3278-00	Switch	2
82	099-4585-00	PWB	
83	075-0119-00	Jack	
84	330-5818-00	Pressed part	
85	852-5187-00	Extension lead	
86	307-0255-17	Rear cover	
87	330-5911-00	Pressed part	
88	335-0725-00	Molded part	
89	850-1855-01	A-lead	
90	076-0135-00	Plug	
91	335-0779-00	Molded part	
92	743-2000-01	E-ring	

REF.NO.	PART NO.	DESCRIPTION	★ Rank
93	746-0592-00	Special washer	
94	746-0660-00	Special washer	
95	722-0231-00	Special nut	
96	745-0430-02	Special washer	
97	722-0320-00	Special nut	
98	742-3000-21	Toothed washer	
99	722-0282-00	Special nut	
100	745-0485-00	Special washer	
101	746-0662-00	Special washer	
102	743-4000-01	E-ring	
103	716-0297-00	Special screw	
104	702-3008-81	Taping screw (M3×8)	
105	702-3008-89	Taping screw (M3×8)	
106	702-2605-89	Taping screw M2.6×5)	
107	714-3006-81	Machine screw (M3×6)	
108	714-3008-81	Machine screw (M3×8)	
109	714-4006-76	Machine screw (M4×6)	
110	714-3020-81	Machine screw (M3×20)	
111	714-3010-11	Machine screw (M3×10)	
112	714-2316-11	Machine screw (M2.3×16)	
113	735-4012-19	D-sems screw (M4×12)	
114	330-5884-00	Pressed part	
115	735-3006-11	D-sems screw (M3×6)	
116	737-3006-11	Sems screw (M3×6)	
117	737-3030-11	Sems screw (M3×30)	
118	702-3006-81	Taping screw (M3×6)	
119	702-3010-11	Taping screw (M3×10)	

REF.NO.	PART NO.	DESCRIPTION	★ Rank
120	735-3008-11	D-sems screw (M3×8)	
121	345-2725-00	Rubber part	
122	341-1129-00	Machined part	
123	345-2421-00	Rubber part	
124	820-3030-09	Vinyl-tube	
125	380-3592-00	Knob	2
126	340-0396-00	Spacer	
127	287-1314-03	Name plate	
128	330-5947-00	Pressed part	
129	345-2724-00	Rubber part	
130	335-0838-00	Molded part	
131	335-0786-00	Molded part	
132	335-0787-00	Molded part	
133	335-0839-00	Molded part	
134	335-0840-00	Molded part	
135	750-1757-00	Spring	
136	732-3006-11	Sems screw (M3×6)	
137	340-0397-00	Spacer	
138	285-0664-00	Guide label	
139	330-5971-00	Pressed part	
140	074-0526-00	Outlet socket	
141	330-5912-00	Pressed part	
142	099-4610-00	PWB	
143	723-4000-21	Hexagon nut	
144	740-4000-11	Flat washer	

◎Electric parts

NOTE: Ⓢ indicates special part

REF.NO.	PART NO.	DESCRIPTION	Rank
$L_{1,1'}$	010-1681-00	Coil	3
$Coil_{103}$	010-1716-00	Coil	3
$Coil_{102}$	010-1717-00	Coil	3
$Coil_{200}$	010-1718-00	Coil	3
$L_{2,2',101,101'}$	010-1719-00	Coil	3
$VR_{1,1',2,2',300,300'}$	012-2740-00	Variable resistor (10K Ω)	2
VR_{103}	012-3170-03	Variable resistor (3K Ω)	2
VR_{104}	012-3170-04	Variable resistor (30K Ω)	2
$VR_{3,3',7,7'}$	012-3249-00	Variable resistor (30K Ω)	2
$VR_{102,102'}$	012-3250-00	Variable resistor (500 Ω)	2
$VR_{9,9'}$	012-3278-00	Variable resistor (200K Ω)	2
$VR_{101,101'}$	012-3294-00	Variable resistor (5K Ω)	2
$VR_{6,6'}$	012-3331-00	Variable resistor (100K Ω)	2
$VR_{8,8'}$	012-3504-00	Variable resistor (10K Ω)	2
$S_{413,412}$	013-2690-02	Switch	2
$S_{3a,3b,3c}$	013-3289-00	Switch	2
$S_{1a}\sim S_{1j}$ $S_{1a'}\sim S_{1j'}$	013-3275-00	Switch	2
$S^{4a,4a'}_{4b,4c}$	013-3276-00	Switch	2
$S_{2a,2b,3a,b}$	013-3277-00	Switch	2
$S_{5,5'}$	013-3278-00	Switch	2
Muting relay	014-0428-00	Relay	2
	007-1057-00	Output trans	3
	015-0211-00	Plunger	2

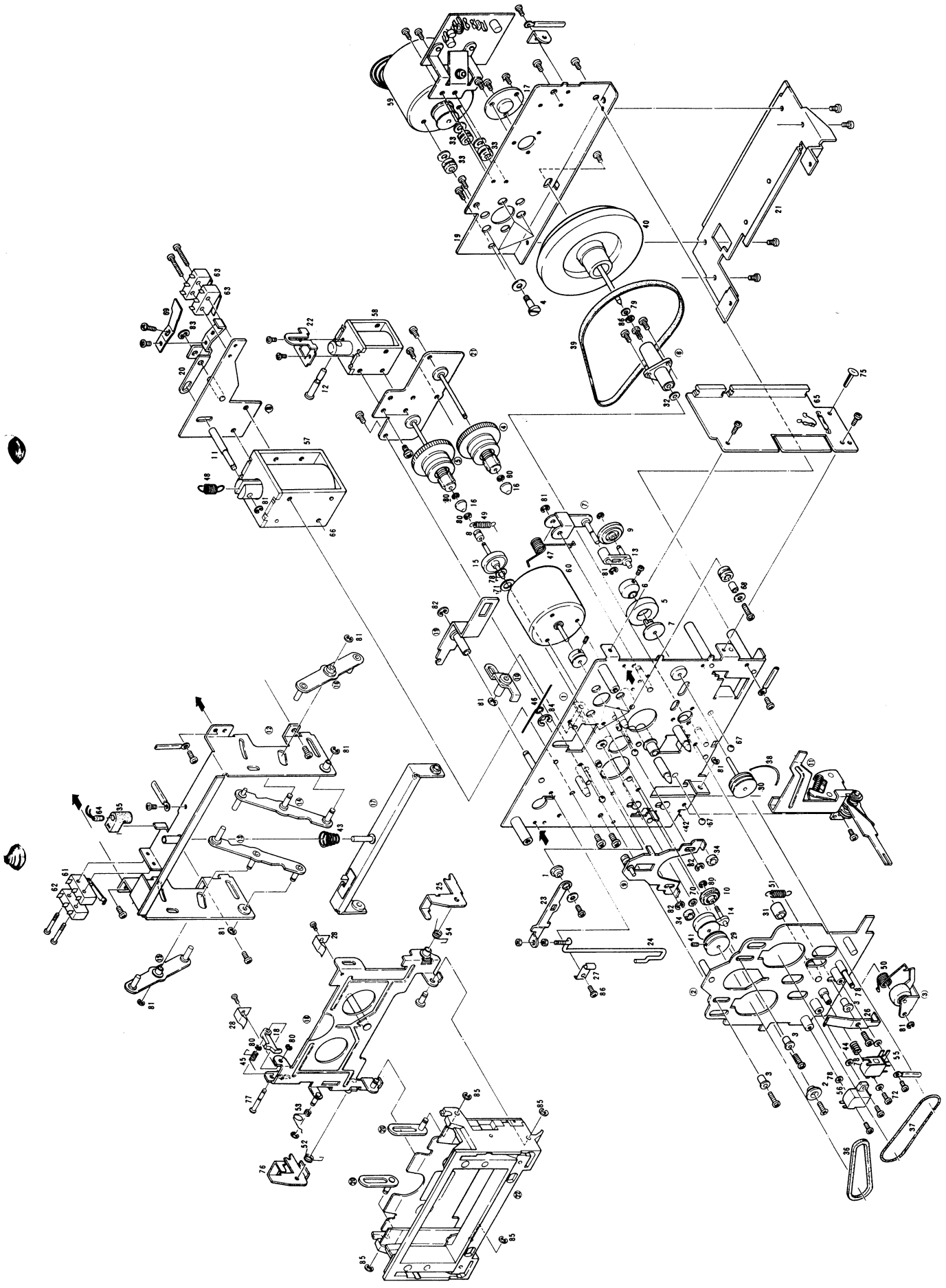
REF.NO.	PART NO.	DESCRIPTION	Rank
$PL_{2,3}$	017-0320-06	Pilot lamp	1
$PL_{1,4}$	017-0320-07	Pilot lamp	1
	017-0320-08	Pilot lamp	1
	017-0320-09	Pilot lamp	1
$IC_{301,301'}$	051-0064-00	IC	1
$Q^{103,103'}_{108,108'}$	100-0672-02	Transistor (2SA672B)	1
$Q_{6,111,112,113}$	102-0373-00	Transistor (2SC373)	1
$Q_{104,104'}$	102-0732-27	Transistor (2SC732BL)	1
$Q_{101,101'}$	102-0732-28	Transistor (2SC732GR)	1
$Q^{5,5',105,105'}_{109,109'}$	102-0733-27	Transistor (2SC733BL)	1
$Q_{110,110'}$	102-0733-28	Transistor (2SC733GR)	1
$Q_{1,2,1',2'}$	102-1000-27	Transistor (2SC1000BL)	1
$Q_{3,4,3',4'}$	102-1000-28	Transistor (2SC1000GR)	1
$Q_{200,201'}$	102-1162-57	Transistor (2SC1162WT-C)	1
Q_{203}	102-1214-04	Transistor (2SC1214D)	1
Q_{202}	103-0234-25	Transistor (2SD234Y)	1
$Q_{106,106'}$	108-0030-34	Transistor (2SK30A-D)	1
$D^{102,102'}_{105,105',107,107',108,108',109,109'}$	001-0020-00	Diode(1N60)	3
$D^{203,204,205}_{206,209,210}$	001-0071-00	Diode(10D-C1R)	3
$D^{201,202}_{207,208}$	001-0072-00	Diode(10D-C1B)	3
$D_{401}\sim_{412}$	001-0077-00	Diode(10D4)	3
D_{200}	001-0101-00	Diode(HZ9A)	3

REF.NO.	PART NO.	DESCRIPTION	Rank
$D_{103,104,106}^{2\sim5,110}$	001-0112-00	Diode(1S1588)	3
D_{425}	001-0132-00	Diode(02Z8.2A)	3
$R_{118,118}^{113,113}$	032-0022-00	Film resistor Ⓢ(150KΩ)	
$R_{114,114}$	032-0023-00	Film resistor Ⓢ(180KΩ)	
$R_{123,123}$	032-0024-00	Film resistor Ⓢ(3.3KΩ)	
$C_{215,216}$	042-0165-00	Electrolytic capacitor Ⓢ(16V2200μF)	
C_{26}	043-0022-00	Ceramic capacitor Ⓢ(250V0.04μF)	
$C_{217,218,219}$	043-0065-00	Ceramic capacitor Ⓢ(4700PF)	
$C_{210,211,214}$	043-0023-00	Ceramic capacitor Ⓢ(500V0.02μF)	
$C_{108,108}$	043-0066-00	Polyester capacitor Ⓢ(50V5600PF)	
$C_{109,109}$	043-0067-00	Polyester capacitor Ⓢ(50V0.027μF)	
$C_{110,110}$	043-0068-00	Polyester capacitor Ⓢ(50V4700PF)	
C_{200}	043-0087-00	Polystylen capacitor Ⓢ(125V5600PF)	
$C_{129,127,127}$	180-1054-62	Electrolytic capacitor (50V1μF)	
$C_{301,301}$	180-1064-22	Electrolytic capacitor (10V10μF)	
$C_{125,125}$	180-1064-42	Electrolytic capacitor (25V10μF)	
$C_{14,14}^{6,6,7,7}$	180-1074-12	Electrolytic capacitor (6.3V100μF)	
$C_{27,28}$	180-1074-22	Electrolytic capacitor (10V100μF)	
$C_{212,213,204}$	180-1074-42	Electrolytic capacitor (25V100μF)	
$C_{307,17,17}$	180-2274-42	Electrolytic capacitor (25V220μF)	
$C_{128,128}$	180-4754-32	Electrolytic capacitor (16V4.7μF)	
$C_{114,114}$	180-4764-22	Electrolytic capacitor (10V47μF)	
C_{207}	180-4764-52	Electrolytic capacitor (35V47μF)	
C_{208}	180-4764-62	Electrolytic capacitor (50V47μF)	
C_{121}	180-4774-32	Electrolytic capacitor (16V470μF)	
C_{206}	180-4774-52	Electrolytic capacitor (35V470μF)	
C_{209}	180-4774-62	Electrolytic capacitor (50V470μF)	
$C_{308,102}^{15,15,16,16}$	181-1063-32	Electrolytic capacitor (16V10μF)	
$C_{19,19,21,21}$	181-1063-52	Electrolytic capacitor (35V10μF)	
$C_{300,300,123,123}^{4,4,11,11}$	181-4753-52	Electrolytic caPacitor (35V4.7μF)	
$C_{3,3}$	141-1022-11	Polyester capacitor (50V1000PF)	
$C_{201,203}^{124,124}$	141-1032-12	Polyester capacitor (50V0.01μF)	
$C_{118,118}$	141-1041-15	Polyester capacitor (50V0.1μF)	
$C_{116,119,201}^{205,112,112}$	141-1042-15	Polyester capacitor (50V0.1μF)	
$C_{10,10}$	141-1832-12	Polyester capacitor (50V0.018μF)	
$C_{22,22}$	141-2222-11	Polyester capacitor (50V2200PF)	
$C_{303,303,304,305,305}^{302,302,303}$	141-2232-13	Polyester capacitor (50V0.022μF)	
$C_{20,20}$	141-3932-13	Polyester capacitor (50V0.039μF)	
$C_{126,126}$	141-6822-11	Polyester capacitor (50V6800PF)	
$C_{18,18}$	141-6832-14	Polyester capacitor (50V0.068μF)	
$C_{24,24}$	141-8212-11	Polyester capacitor (50V820PF)	
$C_{5,5}$	143-3322-14	Polystylen capacitor (50V3300PF)	
$C_{106,106}$	144-1002-11	Mica capacitor (50V10PF)	
$C_{25,25}^{13,13,12,12}$	144-1012-14	Mica capacitor (50V100PF)	
$C_{23,23,101,101}$	144-2012-17	Mica capacitor (50V200PF)	
$C_{8,8,115,115}$	144-4702-12	Mica capacitor (50V47PF)	
$C_{120,120}$	148-3342-12	ML capacitor (50V0.33μF)	
$C_{1,1,2,20}$	167-1044-01	Ceramic capacitor (50V0.1μF)	
R_{156}	110-1002-41	Solid resistor (½W10Ω)	
$R_{36,36}$	110-1232-41	Solid resistor (½W12KΩ)	
$R_{150,150}$	110-1822-41	Solid resistor (½W1.8KΩ)	
$R_{24,24}$	110-1891-41	Solid resistor (½W1.8Ω)	

REF.NO.	PART NO.	DESCRIPTION	Rank
$R_{143,143}$	110-2242-41	Solid resistor (½W220KΩ)	
$R_{TP_{2,2,3,3}}^{101,101}$	110-2742-41	Solid resistor (½W270KΩ)	
$R^{105,105,155}$	110-3322-41	Solid resistor (½W 3.3KΩ)	
$R_{112,112}^{120,120}$	110-3332-41	Solid resistor (½W33KΩ)	
$R_{23,23}$	110-8291-41	Solid resistor (½W8.2Ω)	
R_{202}	111-1001-32	Film resistor (¼W10Ω)	
$R_{108,108}$	111-1011-32	Film resistor (¼W100Ω)	
	111-1021-32	Film resistor (¼W1KΩ)	
$R_{140,140}$	111-1021-32	Film resistor (¼W1KΩ)	
$R_{131,131}^{16,16,157}$	111-1031-32	Film resistor (¼W10KΩ)	
$R_{13,13}$	111-1051-32	Film resistor (¼W1MΩ)	
$R_{110,110}$	111-1211-32	Film resistor (¼W120Ω)	
$R_{135,135}$	111-1241-32	Film resistor (¼W120KΩ)	
$R_{4,4}$	111-1511-32	Film resistor (¼W150Ω)	
$R_{26,26,153}$	111-1521-32	Film resistor (¼W1.5KΩ)	
$R_{141,141}^{3,3,128,128}$	111-1531-32	Film resistor (¼W15KΩ)	
$R_{7,7}$	111-1541-32	Film resistor (¼W150KΩ)	
$R_{10,10}$	111-1841-32	Film resistor (¼W180KΩ)	
$R_{109,18,18,5,5,29,29}^{11,11,109}$	111-2221-32	Film resistor (¼W2.2KΩ)	
$R_{117,117}^{30,30}$	111-2231-32	Film resistor (¼W22KΩ)	
R_{203}	111-2421-32	Film resistor (¼W2.4KΩ)	
$R_{31,31}$	111-2441-32	Film resistor (¼W240KΩ)	
$R_{205,119,119}^{137,137}$	111-2721-32	Film resistor (¼W2.7KΩ)	
$R_{115,115}^{39,40}$	111-2731-32	Film resistor (¼W27KΩ)	
$R_{149,142,142,144,144}^{35,35,149}$	111-2741-32	Film resistor (¼W270KΩ)	
$R_{139,139}$	111-3301-32	Film resistor (¼W33Ω)	
$R_{134,134,148,148}^{25,25,27,27}$	111-3331-32	Film resistor (¼W33KΩ)	
$R_{19,19}$	111-3341-32	Film resistor (¼W330KΩ)	
$R_{9,9,21,21}$	111-3911-32	Film resistor (¼W390KΩ)	
$R_{2,2,32,32}$	111-3931-32	Film resistor (¼W39KΩ)	
$R_{6,6,17,17}$	111-3941-32	Film resistor (¼W390KΩ)	
$R_{138,138}^{129,129}$	111-4701-32	Film resistor (¼W47Ω)	
$R_{151,104,104}$	111-4711-32	Film resistor (¼W470Ω)	
$R_{33,33}$	111-4721-32	Film resistor (¼W4.7KΩ)	
$R_{122,136,136}^{102,102,122}$	111-4731-32	Film resistor (¼W47KΩ)	
$R_{154,103,103}$	111-4741-32	Film resistor (¼W470KΩ)	
$R_{12,12}$	111-5131-32	Film resistor (¼W51KΩ)	
$R_{301,301}^{111,111}$	111-5611-32	Film resistor (¼W560Ω)	
$R_{152,204}$	111-5621-32	Film resistor (¼W5.6KΩ)	
$R_{22,22}$	111-5631-32	Film resistor (¼W56KΩ)	
$R_{106,106}^{8,8,20,20}$	111-6821-32	Film resistor (¼W6.8KΩ)	
$R_{127,127}$	111-6841-32	Film resistor (¼W680KΩ)	
R_{124}	111-8211-32	Film resistor (¼W820Ω)	
$R_{133,133,132}^{200,126,126}$	111-8221-32	Film resistor (¼W8.2KΩ)	
$R_{14,14,15,15}$	111-8231-33	Film resistor (¼W82KΩ)	
$R_{41,42}$	111-8291-33	Film resistor (¼W8.2Ω)	
R_{44}	114-2711-61	Film resistor (2W270Ω)	
R_{302}	114-3912-61	Film resistor (2W390Ω)	
$R_{145,146}$	114-5612-61	Film resistor (2W560Ω)	
R_{43}	114-6811-61	Film resistor (2W680Ω)	
R_{158}	114-6812-52	Film resistor (1W680Ω)	

■EXPLODED VIEW:

◎Mechanism section



■PARTS LIST:

◎Mechanism section

NOTE: ○ indicates assembly part

REF.NO.	PART NO.	DESCRIPTION	Rank
①	960-2983-00	Deck plate assembly	
②	960-2977-00	Head plate assembly	
③	960-2982-00	Roller assembly	3
④	960-2971-00	Reel base assembly	3
⑤	960-2972-00	Reel base assembly	3
⑥	960-2973-00	Housing assembly	
⑦	960-2978-00	Idler rink assembly	
⑧	960-2994-00	Guide-P-assembly	
⑨	960-2992-00	Brake-P-assembly	
⑩	960-2991-00	Brake rink assembly	
⑪	960-0005A	Eject-L-assembly	
⑫	960-2986-00	Guide-P-assembly	
⑬	960-2989-00	Lever-A-assembly-R	
⑭	960-2995-00	Lever-A-assembly-L	
⑮	960-2990-00	Lever-B-assembly-R	
⑯	960-2996-00	Lever-B-assembly-L	
⑰	960-2987-00	Slide-P-assembly	
⑱	960-2985-00	Deck plate assembly	
⑲	960-2979-00	Lever-A-assembly	
⑳	960-3004-00	Stopper assembly	
㉑	960-2981-00	Base plate assembly	
㉒	960-0006A	Pack case assembly	
1	632-0656-00	Bush B	
2	632-0657-00	Bush C	
3	632-0637-00	Bush	
4	632-0638-00	Special screw	
5	632-0652-00	Magnet	
6	632-0659-00	Ring A	
7	630-0828-00	Molded part	
8	632-0639-00	Sleeve	
9	632-0594-00	Idler A	3
10	632-0617-00	Idler B	3
11	632-0640-00	Shaft	
12	632-0654-01	Plunger pin	
13	631-0196-00	Rink	
14	631-0197-00	FF rink	
15	631-0198-00	FF pulley	
16	631-0200-00	Cap	
17	631-0199-00	Stand	
18	631-0204-00	lever	
19	630-0939-00	Motor plate	
20	630-0958-01	Switch rink	
21	630-0959-00	Bracket	
22	630-0887-00	Plunger guide	
23	630-0966-00	Lock lever	
24	630-0967-00	Lock shaft	
25	630-0955-01	Lock plate	
26	630-0968-00	Plate spring	
27	630-0969-00	Plate spring	
28	630-0943-00	Plate spring	
29	603-0044-00	FF pulley A	
30	604-0020-00	Pulley	
31	345-2700-00	Rubber part	
32	345-2701-00	Rubber part	
33	345-2693-00	Rubber part	
34	345-2697-00	Rubber part	
35	345-2515-00	Rubber part	
36	602-0035-00	Belt	1
37	602-0036-00	Belt	1
38	602-0037-00	Belt	1
39	602-0038-00	Belt	1
40	611-0043-00	Flywheel	
41	745-0557-00	FF ring	
42	750-1728-00	Spring	
43	750-1730-00	Spring	
44	750-1731-00	Spring	
45	750-1732-00	Spring	
46	750-1735-00	Spring	
47	750-1736-00	Spring	
48	750-1737-00	Spring	
49	750-1738-00	Spring	
50	750-1741-00	Spring	
51	750-1742-00	Spring	
52	750-1740-00	Spring	
53	750-1754-00	Spring	
54	750-1755-00	Spring	
55	011-0234-00	Head	2
56	011-0235-00	Head	2
57	015-0211-01	Plunger	2
58	015-0212-00	Plunger	2
59	020-0329-00	Motor	2
60	020-0330-00	Motor	2
61	013-3274-00	Switch	2
62	013-3236-00	Switch	2
63	013-3189-01	Switch	2
64	017-0320-02	Pilot lamp	1
65	990-0230-00	PWB assembly	
66	001-0077-00	Diode(10D4)	3
67	632-0661-00	Steel ball	
68	632-0663-00	Sleeve	
69	630-0971-00	Plate spring	
70	746-0653-01	Special washer	

REF.NO.	PART NO.	DESCRIPTION	Rank
71	745-0559-00	Ring-E	
72	716-0249-00	Special screw	
73	330-4896-00	Pressed part	
74	820-4020-02	Vinyl-tube	
75	631-0211-00	Molded part	
76	630-0955-00	Lock plate	
77	632-0643-00	Shaft	
78	746-0622-00	Special washer	

REF.NO.	PART NO.	DESCRIPTION	Rank
79	746-0609-00	Special washer	
80	734-1500-00	E-ring(M1.5)	
81	734-2000-00	E-ring(M2.0)	
82	734-2500-00	E-ring(M2.5)	
83	734-3000-00	E-ring(M3.0)	
84	734-4000-00	E-ring(M4.0)	
85	744-0016-00	Special E-ring(M2.0)	
86	746-0621-00	Special washer	

⊙Tape Mechanism Control Circuit Electrical Parts List

990-0230-00

REF.NO.	PART NO.	DESCRIPTION	Rank
IC_{401}	051-0065-00	IC	1
D_{425}	001-0132-00	Diode (02Z8.2A)	3
Q_{404}	102-0373-00	Transistor (2SC373)	1
C_{406}	180-1054-21	Electrolytic capacitor (10V10μF)	
C_{404}	180-1074-22	Electrolytic capacitor (10V100μF)	
$C_{402,405}$	180-2274-22	Electrolytic capacitor (10V220μF)	

REF.NO.	PART NO.	DESCRIPTION	Rank
C_{406}	180-1073-22	Electrolytic capacitor (10V100μF)	
C_{401}	165-3935-02	Ceramic capacitor (0.039μFYG)	
R_{414}	111-8221-32	Film resistor (¼W8.2KΩ)	
R_{415}	111-1041-32	Film resistor (¼W100KΩ)	
R_{401}	111-2741-31	Film resistor (¼W270KΩ)	

990-0231-00

REF.NO.	PART NO.	DESCRIPTION	Rank
	014-0429-00	Relay	2
	013-3272-00	Switch	2
Q_{401}～$_{403}$	100-0473-25	Transistor (2SA473Y)	1
$SCR_{401,402}$	001-0115-00	Diode (SFOR2B41)	3
$D_{\substack{419,418,415,414\\416,417,421,420}}$	001-0081-00	Diode (1S1555)	3
$D_{\substack{401,402,403,404\\410,406,407,408}}$	001-0077-00	Diode (10D4)	3
C_{410}	042-0178-00	Electrolytic capacitor (16V1000μF)Ⓢ	
C_{407}	180-2254-62	Electrolytic capacitor (50V2.2μF)	
C_{413}	180-1074-32	Electrolytic capacitor (16V100μF)	
	180-2273-22	Electrolytic capacitor (10V220μF)	
R_{424}	110-3392-42	Solid resistor (½W3.3Ω)	
R_{420}	110-6802-41	Solid resistor (½W68Ω)	
	110-6812-42	Solid resistor (½W680Ω)	

REF.NO.	PART NO.	DESCRIPTION	Rank
R_{426}	110-2212-41	Solid resistor (½W220Ω)	
	110-2222-41	Solid resistor (½W2.2KΩ)	
R_{429}	110-2222-42	Solid resistor (½W2.2KΩ)	
$R_{408,412,428}$	111-1021-32	Film resistor (¼W1KΩ)	
R_{418}	111-2221-32	Film resistor (¼W2.2KΩ)	
$R_{410,411}$	111-3921-32	Film resistor (¼W3.9KΩ)	
$R_{416,419}$	111-1031-32	Film resistor (¼W10KΩ)	
$R_{402,413,423}$	111-3331-32	Film resistor (¼W33KΩ)	
$R_{404,427}$	111-6831-32	Film resistor (¼W68KΩ)	
$R_{403,415}$	111-1041-32	Film resistor (¼W100KΩ)	
R_{409}	114-1092-51	Film resistor (1W1Ω)	
R_{405}	114-3312-61	Film resistor (2W330Ω)	

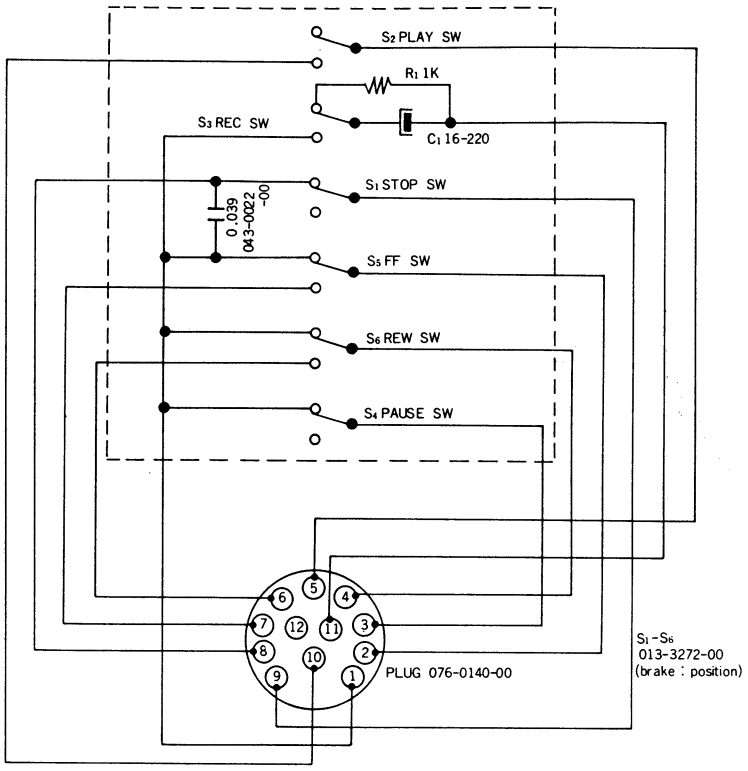
990-0232-00

REF.NO.	PART NO.	DESCRIPTION	Rank
$Q_{409,410}$	102-0373-00	Transistor (2SC373)	1
SCR_{403}	001-0115-00	Diode (SFOR2B41)	3
$D_{413,422,423,424}$	001-0081-00	Diode (1S1555)	3
D_{412}	001-0077-00	Diode (10D4)	3
	013-3281-00	Switch	2
$RELAY_{405}$	014-0429-00	Relay	2
C_{412}	042-0178-00	Electrolytic capacitor Ⓢ (16V1000μF)	
C_{413}	180-1074-32	Electrolytic capacitor (16V100μF)	
C_{414}	180-4764-32	Electrolytic capacitor (16V47μF)	
C_{415}	180-1064-32	Electrolytic capacitor (16V10μF)	

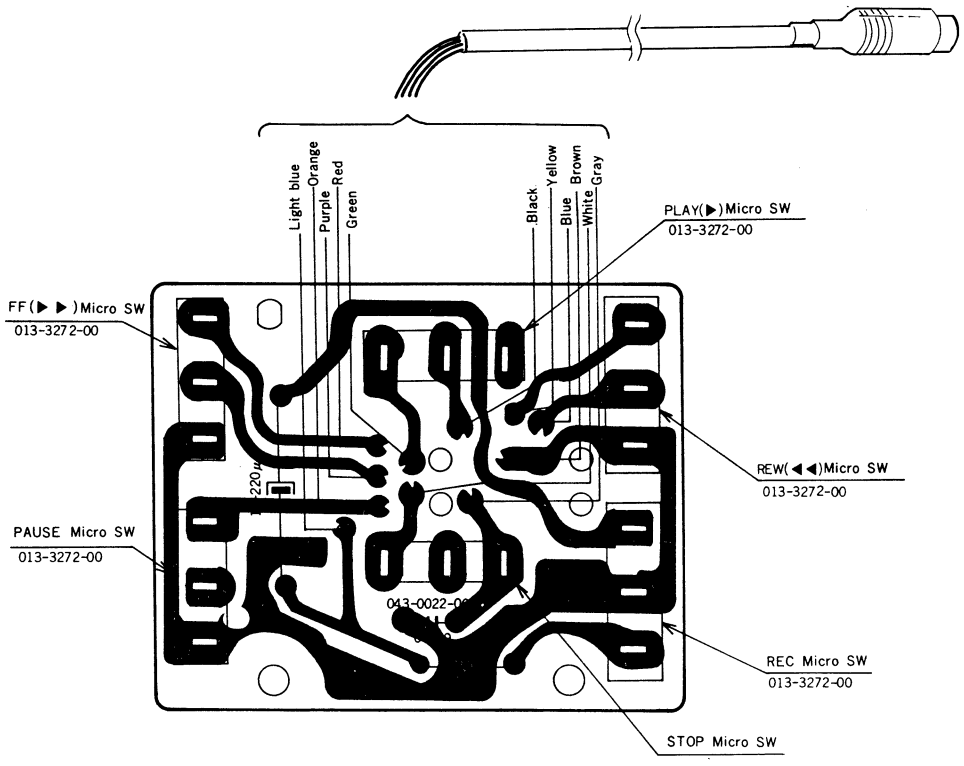
REF.NO.	PART NO.	DESCRIPTION	Rank
R_{431}	110-3392-42	Solid resistor (½W3.3Ω)	
$R_{430,434,435,437}$	111-1021-32	Film resistor (¼W1KΩ)	
R_{440}	111-1821-32	Film resistor (¼W1.8KΩ)	
R_{433}	111-2221-32	Film resistor (¼W2.2KΩ)	
R_{441}	111-2721-32	Film resistor (¼W2.7KΩ)	
R_{432}	111-3321-32	Film resistor (¼W3.3KΩ)	
R_{439}	111-5621-32	Film resistor (¼W5.6KΩ)	
R_{436}	111-3331-32	Film resistor (¼W33KΩ)	
R_{438}	111-5631-32	Film resistor (¼W56KΩ)	

■Remote control box (RKA-028-100)

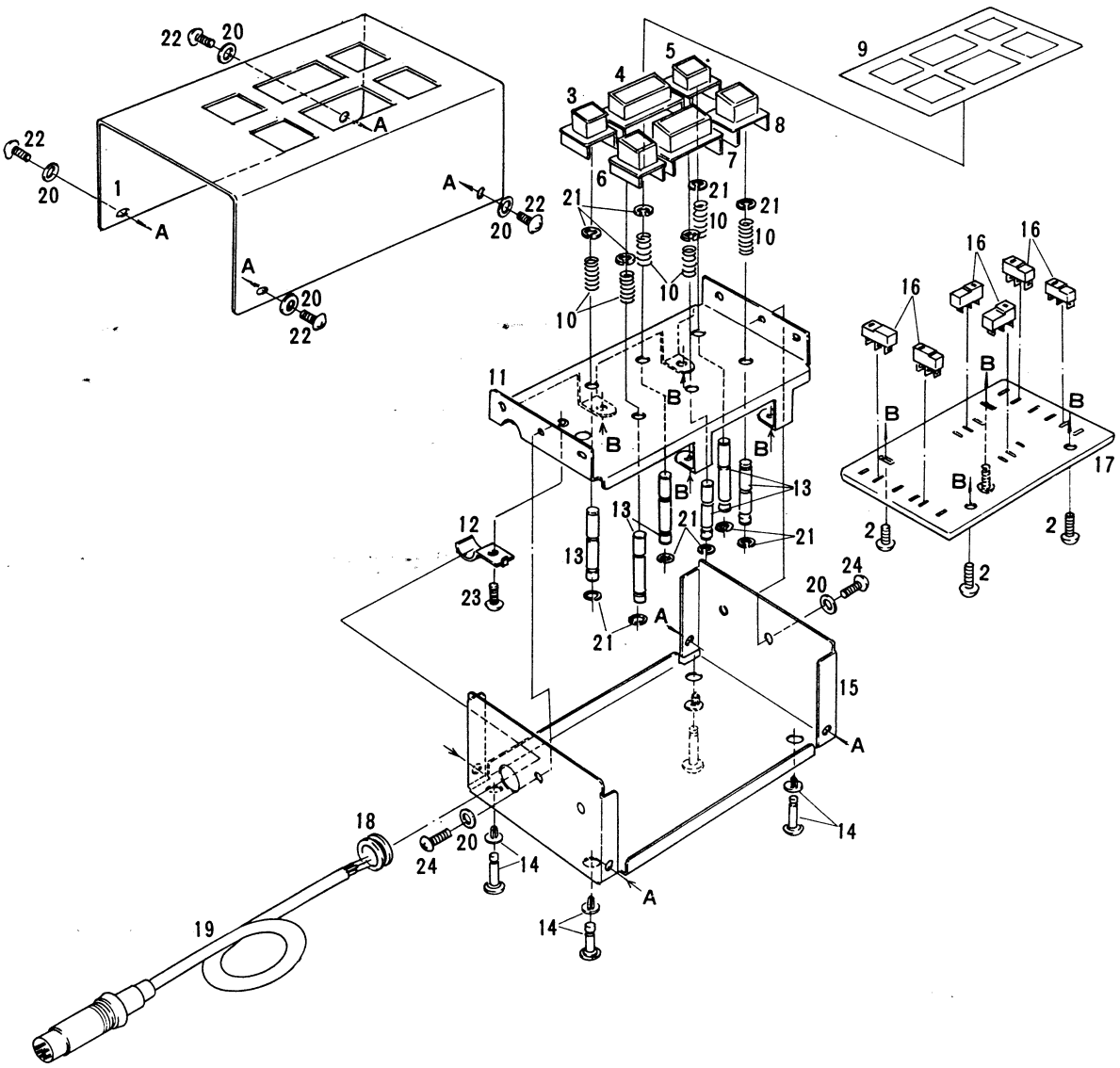
◎Circuit diagram



◎Printed wiring board



◎Exploded view



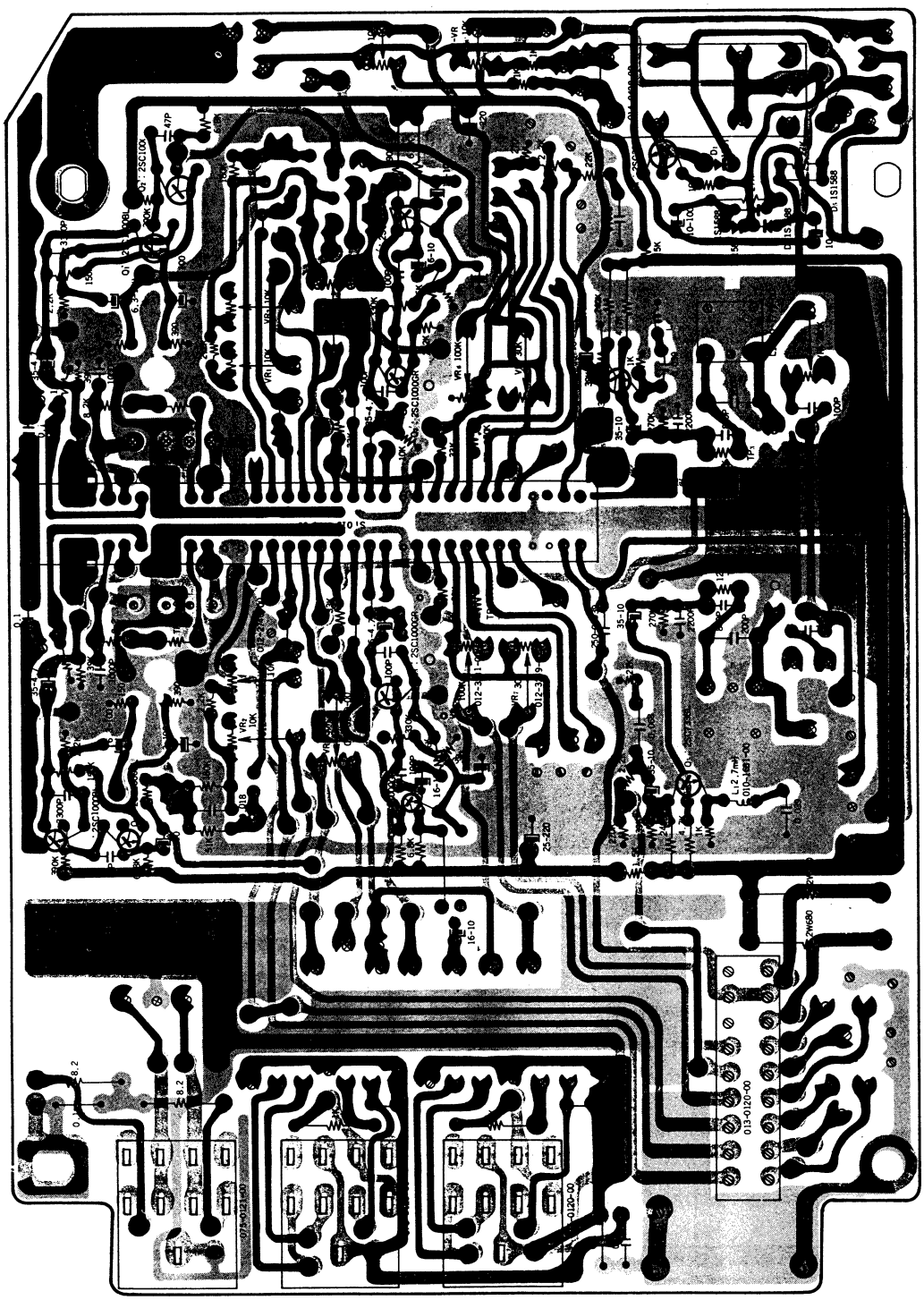
◎Parts list

REF.NO.	PART NO.	DESCRIPTION	Rank
1	371-2617-00	Trim plate	
2	704-3008-81	Taping screw (M3×8)	
3	380-3578-00	Knob	2
4	380-3577-02	Knob	2
5	380-3578-01	Knob	2
6	380-3578-05	Knob	2
7	380-3577-03	Knob	2
8	380-3578-04	Knob	2
9	383-0091-00	Shade	
10	750-1743-00	Spring	
11	330-5961-00	Pressed part	
12	321-0791-00	Clamp	

REF.NO.	PART NO.	DESCRIPTION	Rank
13	341-1145-00	Machined part	
14	335-0846-00	Molded part	
15	311-0990-00	Lower case	
16	013-3272-00	Switch	2
17	099-4626-00	PWB	
18	345-2735-00	Rubber part	
19	852-5212-00	Extension lead	
20	746-0660-00	Special washer	
21	743-2000-01	E-ring(M2)	
22	714-3006-76	Machine screw (M3×6)	
23	714-3006-81	Machine screw (M3×6)	
24	704-3006-89	Taping screw (M3×6)	

■PRINTED WIRING BOARD

◎REC/PW SECTION



Q1,Q2,Q3,Q5 = 2SC1008BL
Q4,Q6,Q7 = 2SC1000GR
Q8 = 2SC373
Q9,Q10 = 2SC733BL

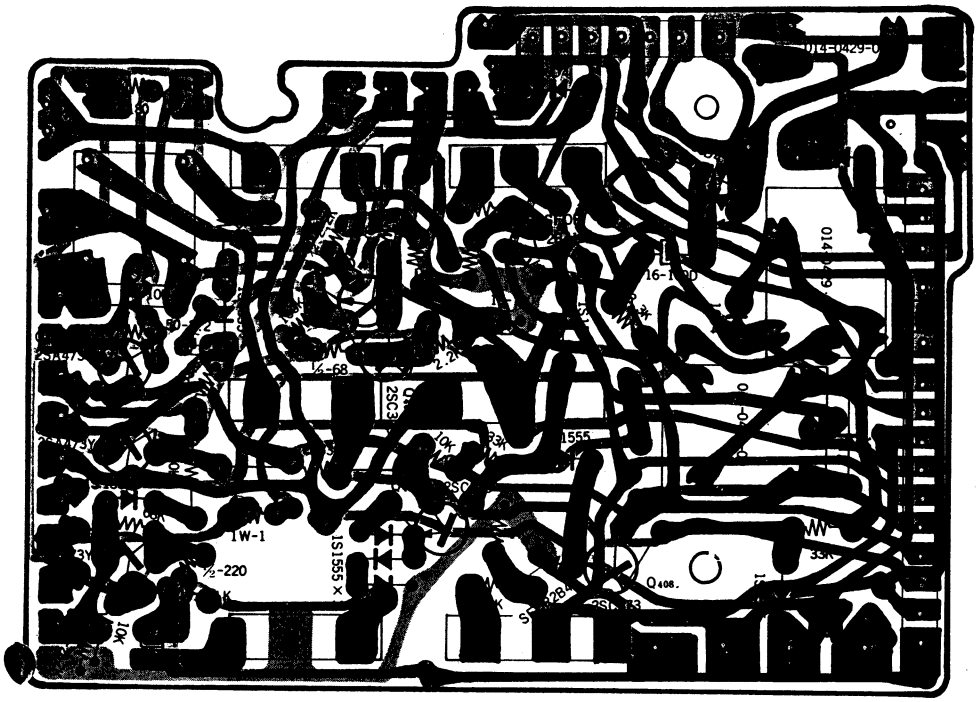
D1 = 100-4
D2,D3,D4,D5 = 1S1588

L1,L2 = 010-1681-00

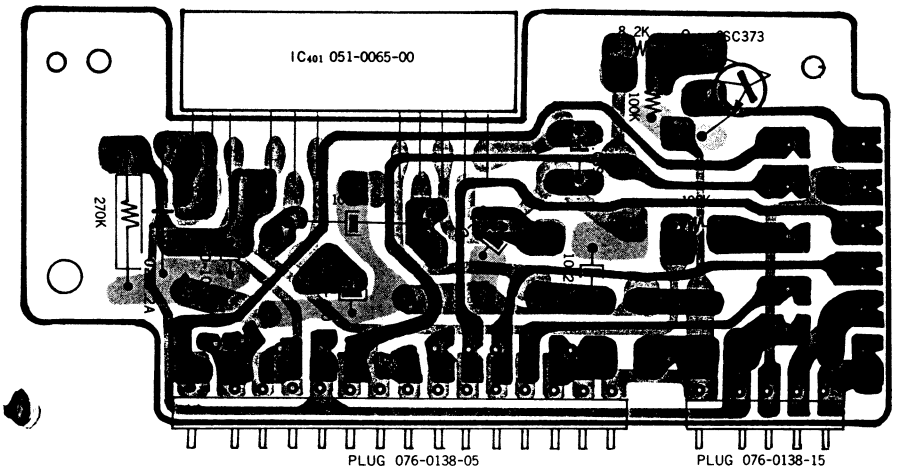
VR1, VR2, VR3, VR7 = 012-2740-00(10K)
VR4, VR5, VR6, VR8 = 012-3249-00(30K)
VR9, VR10 = 012-3331-00(330K)
VR11, VR12 = 012-3504-00(1M)
VR13, VR14 = 012-3278-00(200K)

◎Tape mechanism control circuit PB

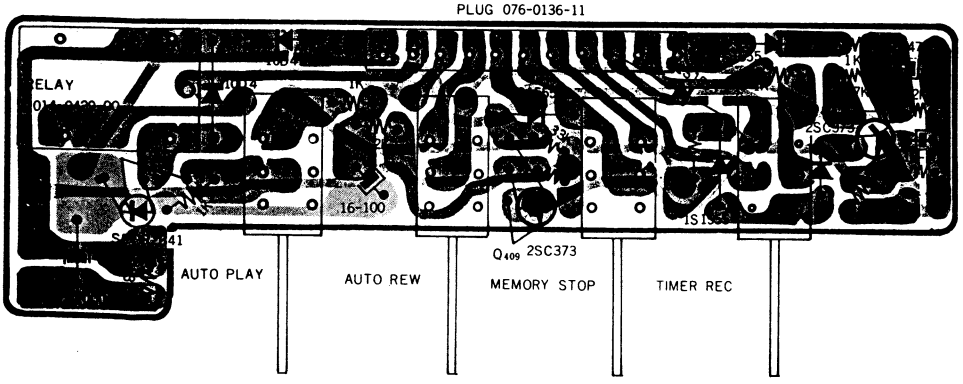
990-0231-00

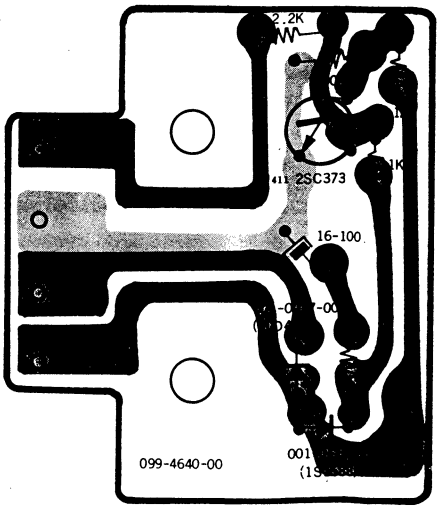


990-0230-00

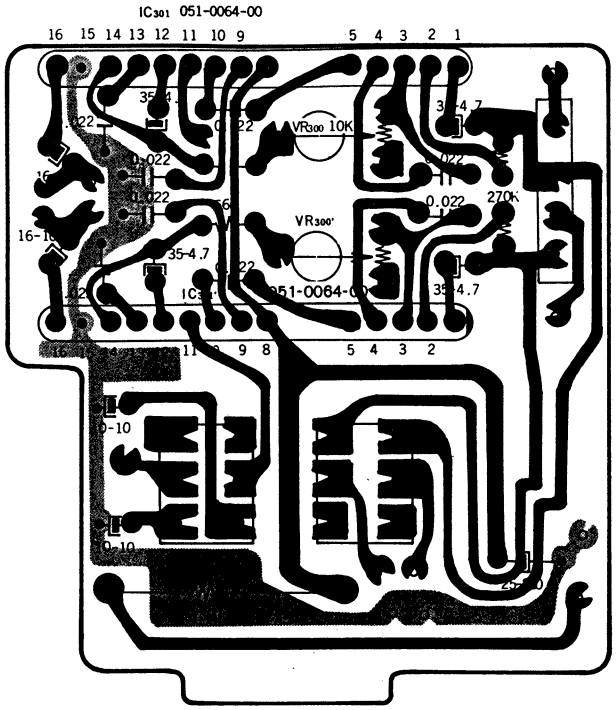


990-2332-00

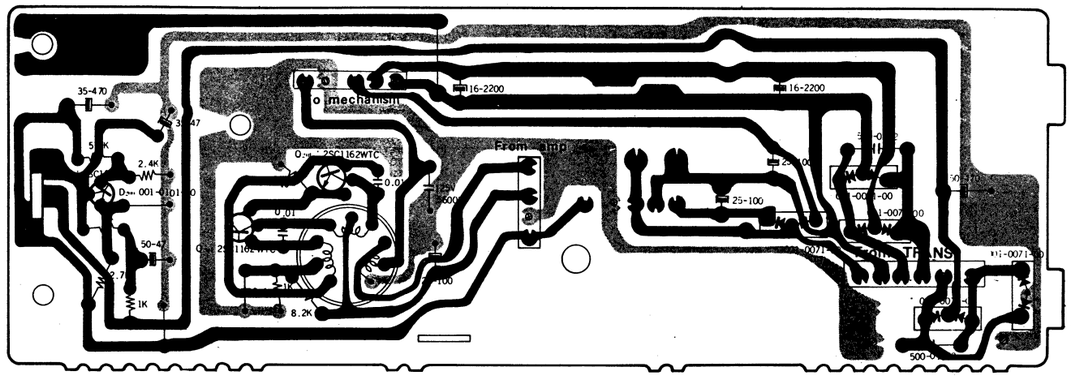




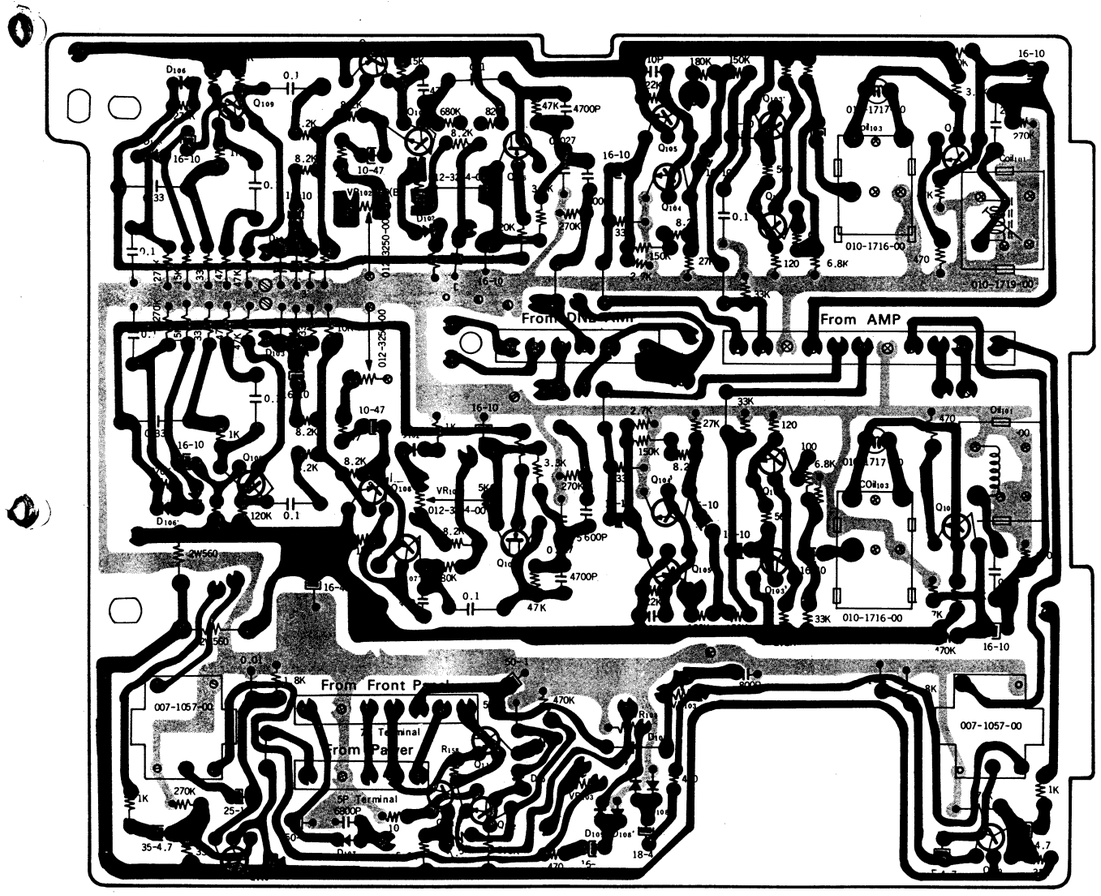
◎DNL SECTION


IC301 051-0064-00
16 15 14 13 12 11 10 9
5 4 3 2 1
VR300 10K
VR300'
0.022
270K
35-4.7
5 4 3 2

◎POWER SECTION



◎DOLBY SECTION



Q_{101} $Q_{101'}$ ···2SC732 GR
Q_{107} $Q_{107'}$ ···2SC458LGC

Q_{102} $Q_{102'}$ ····2SC458LGD
Q_{104} $Q_{104'}$ ···2SC732 BL

Q_{103} $Q_{103'}$ } ···2SA672 Ⓑ
Q_{108} $Q_{108'}$

Q_{105} $Q_{105'}$ } ···2SC733 BL
Q_{109} $Q_{109'}$

Q_{106} $Q_{106'}$·····2SK3DA Ⓓ
Q_{110} $Q_{110'}$·····2SC733 GR

D_{101} ·····001-0132-00(02Z82A)

D_{102} $D_{102'}$ } ···001-0020-00(1N60)
D_{105} $D_{105'}$

D_{103} $D_{103'}$ }
D_{104} $D_{104'}$ } ···001-0112-00(1S1588)
D_{106} $D_{106'}$ }

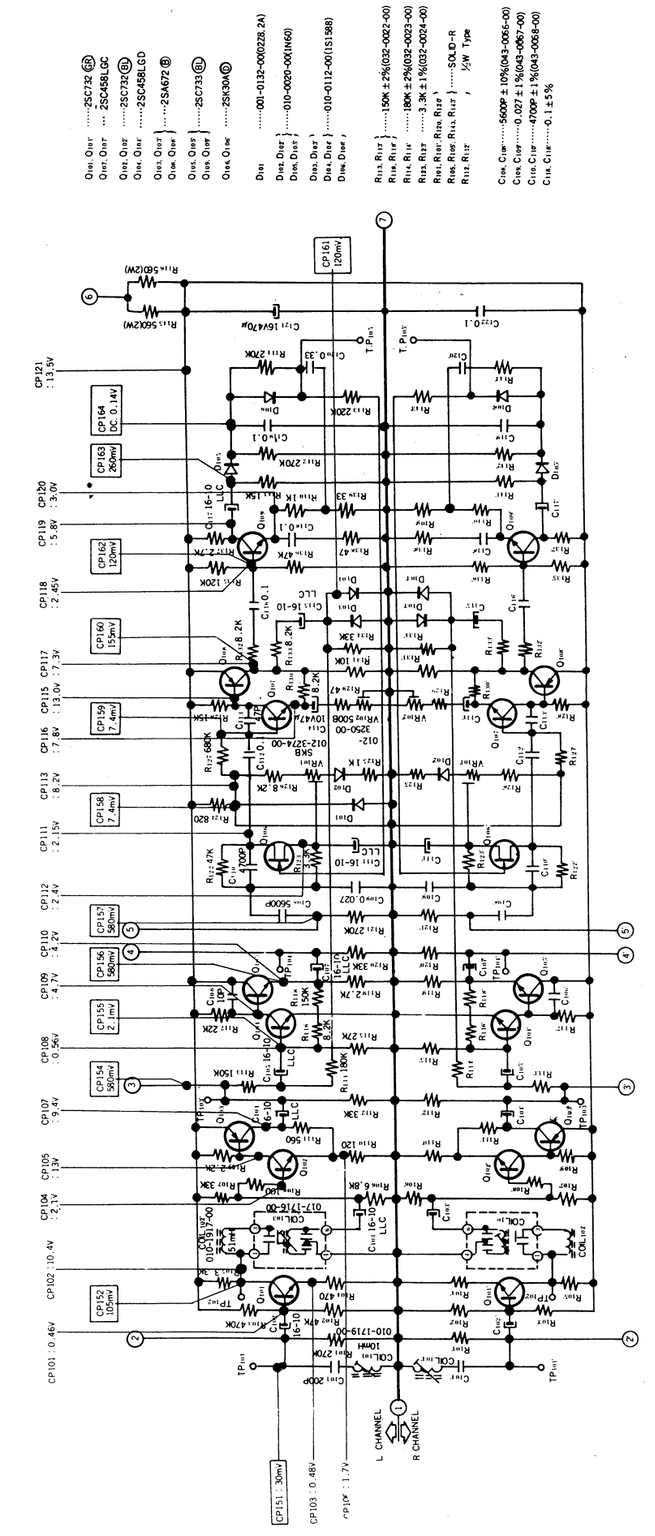
Q_{111} Q_{112} Q_{113} 2SC373

D_{107} $D_{107'}$ }
D_{108} $D_{108'}$ } ···001-0020-00
D_{109} $D_{109'}$ } (1N60)

D_{110} ·····001-0112-00(1S1588)

■CIRCUIT DIAGRAM:

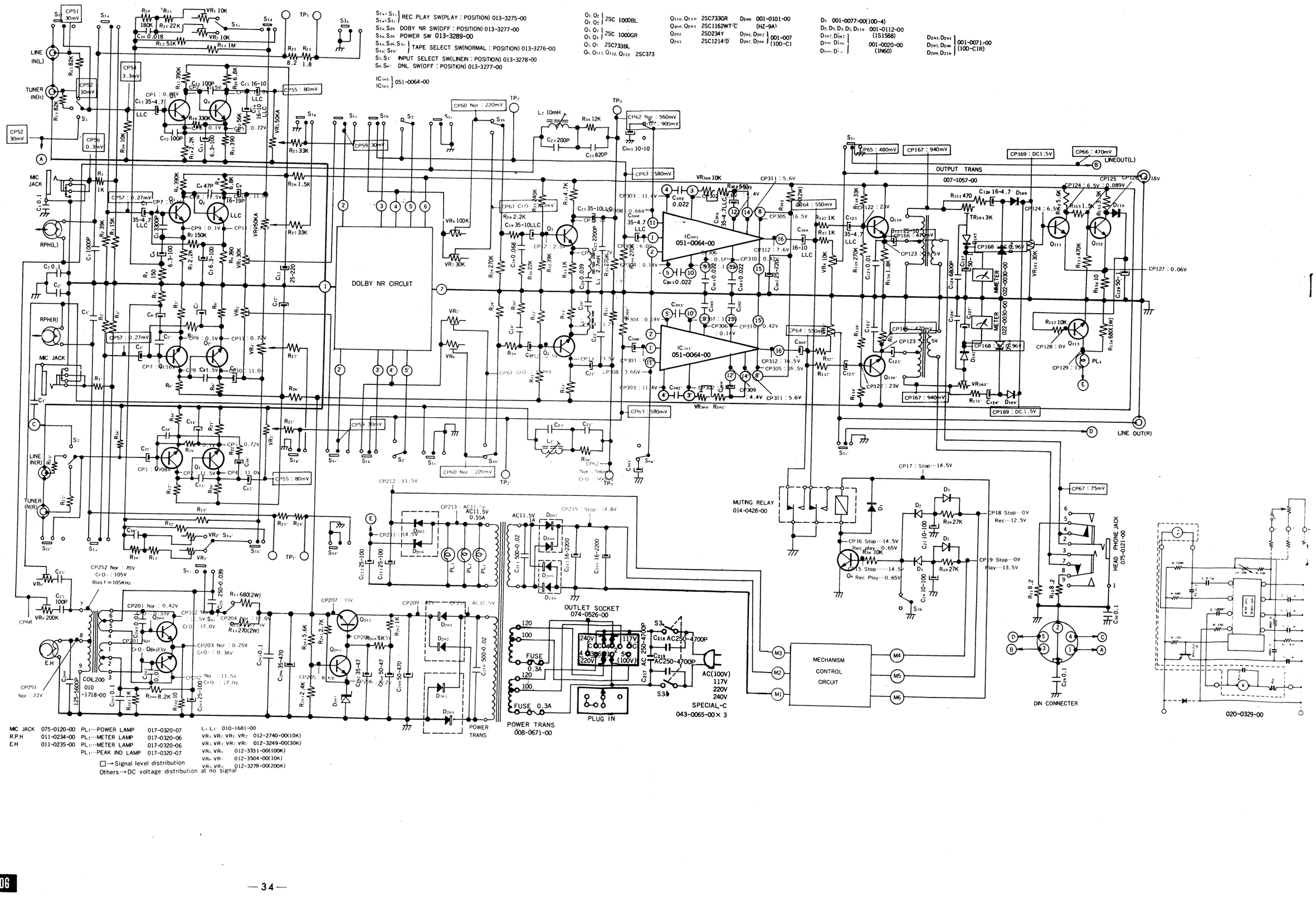
◎Dolby circuit diagram



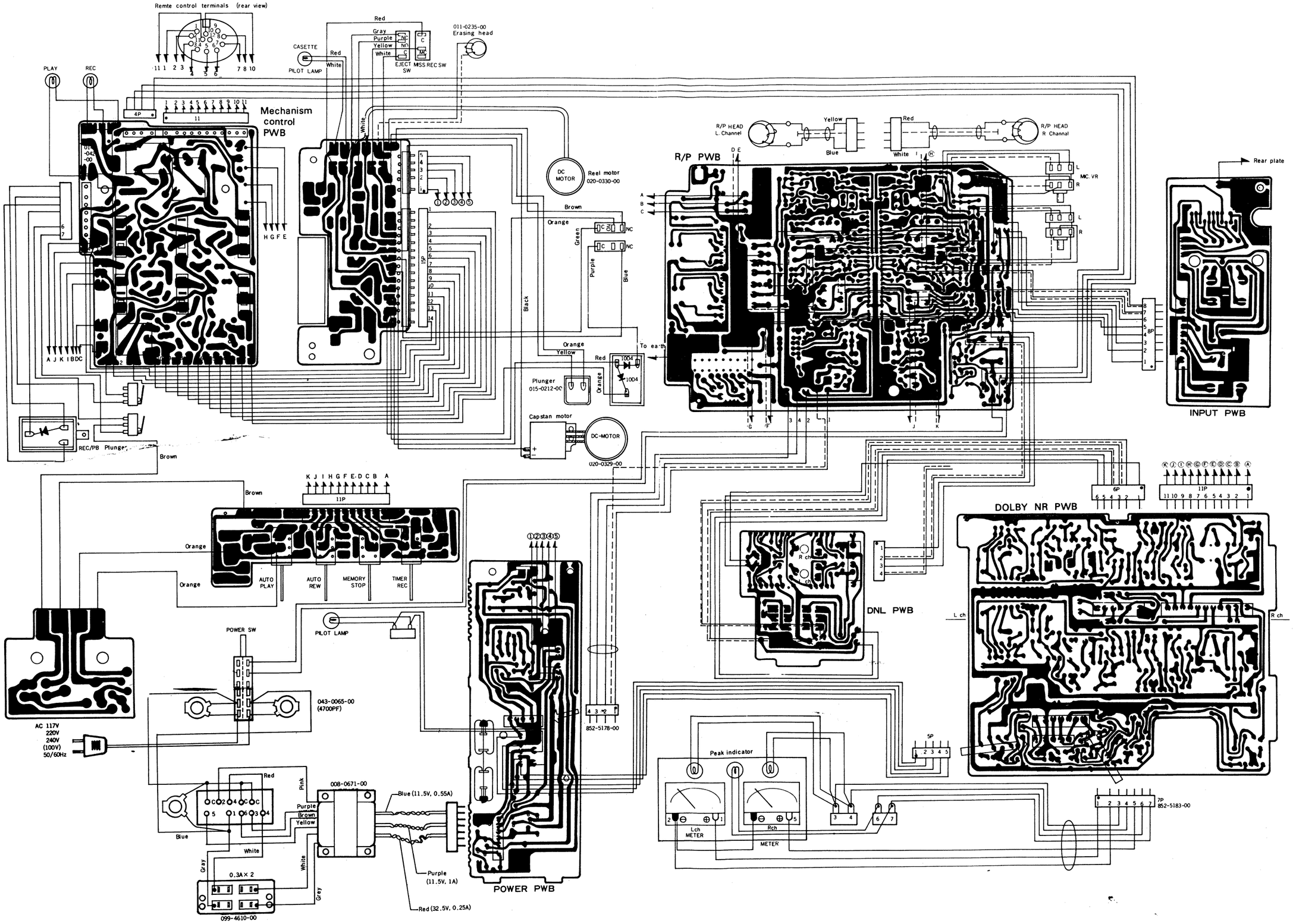
Voltage measurement conditions:
1. Recording condition
   DNL SW·····ON
   DOLBY NR SW·····ON
2. Signal level of each section when voltage at TP-2, TP-2' is 580mV(400Hz)
3. DC voltage measured by multimeter
   Multimeter impedance 20KΩ/V
4. Other signal levels measured by measured by millivoltmeter (however, AC power voltage is measured by multimeter)
   Millivoltmeter input impedance 1MΩ, 25pF
   Distributed capacitance of input cord(shielded cable) approx. 50pF
5. When checking at PLAY, 400Hz 0VU(200nWb/m)TEAC MTT150 ro equivalent) used.
   Voltage at TP-2, TP-2' must be 580mV. test tape must be used.

□→signal level distribution
Others→DC voltage distribution at no signal

■Overall Circuit Diagram



■OVERALL CIRCUIT DIAGRAM



◎Mechanism control circuit diagram